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COMPUTERWORLD

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Comdex host to myriad micro debuts

Show features few surprises

By Eric Bender
CW Staff

LAS VEGAS — While Comdex/Fall '84 saw hundreds of new microcomputer products fighting for the spotlight, the giant computer reseller show produced few major announcements and no blockbusters.

Unlike last year's show, when competing announcements of IBM Personal Computer-compatible systems and windowing software packages held center stage, no high-profile introductions dominated the conversation at Comdex/Fall.

The predicted crop of IBM Personal Computer AT-compatible machines did not materialize, but the show did display scores of new

See **COMDEX** page 13

DEC users get head start implementing Cobol-80

Supporters of proposed standard cite improved readability, maintainability, coding productivity

By Paul Gillin
CW Staff

As the computer industry continues its vigorous and lengthy debate over the nuances of the proposed Cobol-80 standard, a sizable body of Digital Equipment Corp. VAX users has been busily coding, using a compiler based on the unratified version. In recent interviews with *Computerworld*, several of these users praised many features of the new language and added that conversion from existing Cobol-74 programs has posed few or no problems.

Most users pointed to improved readability and ease of maintenance as the main benefits of the new implementation. They specifically said several new verbs, such as in-line PERFORM and EVALUATE, have improved coding productivity. In addition, other features that allow files to be defined externally have enabled programmers to write more modular and flexible code, they said.

"I'd guess we save 20% to 25% in development effort over Cobol-74, mostly because debugging and logic are easier," said Tom Sprawls, president of Gray Matter, Inc., a Phoenix-based systems house that does data processing for 10 companies. "Writing in Cobol-74 is a pain in the neck. But Cobol-80 has eliminated virtually all of the problems," he said.

Thury O'Connor, vice-president of Lexi-Comp, Inc., a small Hudson, Ohio-based software services, programming and facilities management firm, said,

See **COBOL** page 6

Sperry ties systems to Unix

Also releases supermicros, software at Comdex

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. introduced AT&T's Unix operating system to most of its product line in one fell swoop here at Comdex/Fall '84 last week. It announced that Unix versions would be provided for nearly all of its computers, from its personal computers up to its 1100 mainframe series.

Along with that announcement, Sperry revealed its Series 5000 Unix-based supermicrocomputers and factory and office automation software to run on them.

At the low end, Sperry's implementation of Unix for its personal computers will come via Microsoft Corp.'s Xenix 3.0 Unix derivative. At the high end, the 1100 series will gain an AT&T Unix System V operating system called SX 1100.

SX 1100, priced at $1,000 to $1,500 per month, will reportedly execute as an application on the machine's 1100 OS standard operating system, providing access to 1100 OS formatted files. It will also reportedly be able to maintain multiple concurrent SX 1100 environments, each with its own file system.

Sperry will offer Xenix 3.0, meanwhile, for its Models 40, 45 and 50 Personal Computers and the hard-disk version of the Sperry Portable Personal Computer. It is said to require 512K bytes of random-

See **SPERRY** page 11

A license to save on software

By Paul Gillin
CW Staff

SAN DIEGO — North American Philips Corp. has found a novel and efficient way to save hundreds of thousands of data processing dollars. It licenses only one copy of each of seven financial software packages and makes them available to its 19 subsidiaries.

In that manner, North American Philips not only saves licensing costs, but also employs a much smaller maintenance and education staff for its widely diversified business. In fact, it needs only 11 people to support the applications software for 19 subsidiary companies, explained Kenneth Ary, a financial package coordinator for North American Philips. Ary, who is based at Philips' offices in Itasca, Ill., estimated the company saves 65 programmer-years per year under the arrangement. Ary was interviewed at the 15th Software International Users Group meeting held here last week.

There is nothing illegal about the arrangement. Divisions simply load executable versions of the software into their on-site mainframes from the firm's New York data center for on-line data entry. The data is then formatted to update the data bases at the local sites. Not only does the company save money, but the arrangement also allows it to install new

See **SAVE** page 8

TOP OF THE NEWS

A first user of IBM's DB 2 relational data base management system had no major problems using it to query a 1.5-million-record data base. **Page 4.**

All that Jazz. Lotus Development Corp. skipped Comdex last week, but made news there anyway by announcing Jazz, a five-function integrated package for Apple Computer, Inc.'s Macintosh. **Page 6.**

On the up and up. Data processing operations managers are enjoying salary increases this year that are larger than those of other operations managers. **Page 8.**

Photo by D. Waite

Stuck in a rut. That's where Comdex keynoter John Sculley placed the personal computer industry. Meanwhile, Sperry Corp. unveiled a superminicomputer at the Las Vegas extravaganza. **Page 11.**

Computer technology isn't keeping pace with security threats to computer systems. At least that was the opinion of some attendees at a computer security conference last week. **Page 15.**

Texas Instruments, Inc. unveiled a 10½-lb laptop computer with a 12-in. display, while Radio Shack introduced another member of its IBM-compatible micro family. **Page 57.**

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NEWSPAPER

NEWS

IRS seeks system to monitor media reports

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Internal Revenue Service is advertising for an "on-line automated media diagnostic system" that would help IRS press officers do a better job of feeding the news media statements on federal tax regulations.

The computerized system the IRS has in mind — and which officials concede may not exist — would monitor print and broadcast reports to see if the IRS message is getting across to U.S. taxpayers, according to IRS officials and documents. The agency is now searching for a private firm with media analysis experience that can supply such a system.

"Since we don't own the media, we need to find out how best to reach them and communicate with them," said Mike Williams, an analyst with the IRS taxpayer information program. The system is expected to "measure changing IRS objectives and messages . . . against what was actually used [by the media]," an IRS statement said.

For example, the "media diagnostic system" could help press officers determine which publications actually use IRS press releases and identify what format or timing changes are needed to get the information reported, Williams said.

Asked if the system would be used to manipulate the press, Williams responded, "That's why it's called 'media diagnostic system' and not 'media management system.' . . . The opportunity for abuse is out there, but that's not what we intend to do."

> *'The opportunity for abuse is out there, but that's not what we intend to do.'*
> — Mike Williams, IRS

In a solicitation published in the government's *Commerce Business Daily*, the IRS said it seeks an "operational, on-line, automated media diagnostic system for 85 sites throughout the nation that will allow IRS management to determine the effectiveness of its nationwide taxpayer information program."

The IRS said the computer system should supply detailed statistical reports and graphics that will help IRS management measure "the impact of IRS materials on the media, the value of media coverage, the type of audiences reached, media news preferences, the need for localization of media releases and the best distribution methods."

Furthermore, the IRS said, the system must provide categorized mass media listings and must be available to users — the press officers — seven days a week, 24 hours a day.

Williams said the IRS apparently is the first federal agency that has tried to automate its media relations effort. "We're pioneering in this area," he said.

But Williams said it remains an open question whether the solicitation will turn up any vendors that can supply the computer system the IRS wants. If none surfaces by early December, the plan will be dropped, according to Hiram Wilcox, an IRS contracting officer.

Williams stressed that the automated system would help the agency's 63 public affairs officers communicate more efficiently and effectively with the nation's 40,000 media outlets.

Tell us your news views

Hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your company? Have you implemented successful cost-cutting strategies? Is something in your DP shop not working as designed? Know any unsung heroes? Heard any hot news about vendors?

If so, we'd like to hear from you. *Computerworld* has established a reader hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Donovan White, assistant managing editor.

We can't be everywhere — but our readers are.

Datapoint rolls out 32-bit supermicro

By John Desmond
CW Staff

LAS VEGAS — Datapoint Corp. last week announced a 32-bit supermicrocomputer for the office automation market based on dual microprocessors and featuring a Unix look-alike operating system.

Called the Datapoint 3200, the supermicro uses dual Motorola, Inc. 68000 microprocessors and runs Charles River Data System's Unos AT&T Unix-like operating system. It allows connection of up to 28 terminals.

The 3200 is compatible with Datapoint's Attached Resource Computer (ARC) coaxial-cable local-area network and supports Ryan-McFarland Corp.'s RM/Cobol relational data base management system.

In the 3200 hardware, one 68000 processor with a 4K-byte cache memory is dedicated to all applications processing; the other is dedicated to I/O operations, a feature said to result in better response time. Main memory is expandable to 8M bytes, and on-line storage is expandable to 152M bytes, according to the company.

The 3200 interfaces with the ARC network via Datapoint's Intelligent Network Executive-32 (INX-32) Adaptor, an optional internal card and accompanying software. Software utilities reportedly allow ARC users to perform tasks in the Unos context and use the results in their own applications.

The Unos operating system is said to provide file management facilities including multitasking, device-independent I/O, I/O redirection, dynamic file allocation and hierarchical directory structure.

Software options available include the C programming language, RM/Cobol and Databus, Datapoint's business programming language. These are said to provide access to many independently developed application packages. RM/Cobol, previously unavailable on the ARC, is said to allow users to maintain single entries of data and to access required information from a single source.

Ace Microsystems, Ltd.'s LEX word processing program and Microsoft Corp.'s Multiplan spreadsheet are also supported by the 3200, the company said.

An entry-level 3200 includes 1M byte of memory, 32M bytes of disk storage with 1M byte of diskette storage, a 4K-byte cache memory and four serial ports. A choice of three types of terminals, three types of printers and a communications adaptor to emulate IBM's 2780/3780 protocols is available.

The base system is priced at $15,430. The price for Unos is $1,000 and for the INX-32 Adaptor with software, $2,500. The system is available 90 days after order, the vendor said.

Datapoint is located at 9725 Datapoint Drive, San Antonio, Texas 78284.

NEWS SUMMARY

A division of General Motors Corp. has plunged headfirst into relational data base management by becoming a first user of IBM's DB 2 data base management system/**4**

Lotus Development Corp. launched Jazz, an integrated software package for the Apple Computer, Inc. Macintosh, last week/**6**

DP operations managers are said to be experiencing higher salary increases than other operations managers this year/**8**

CW at Software International Users Group: Packaged software installation can go more smoothly if DP and user departments define each other's responsibilities, one user said . . . Looking ahead before installing an application can keep software running for years, according to another user/**9-10**

CW at Comdex/Fall '84: Sperry Corp. chose Comdex as a stage to unwrap, among other products, its 7000/40 32-bit superminicomputer . . . Apple Computer, Inc.'s chief sees innovation as the only way the microcomputer industry can escape its present rut . . . Micro managers looked to Comdex as a way of staying a step ahead of the continuing technology explosion/**11-13**

CW at Computer Security Conference: Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime, according to GTE Telenet Communications Corp.'s chief . . . While they give security product vendors an 'A' for effort, most visitors here did not think technology is keeping pace with the threats to computer systems . . . When designing computer system security, users had better consider their security's security, one expert said/**14-16**

Industry Spotlight: The computer leasing market/**17-23**

CW at Data Training: Sensitizing employees to the importance of data security is essential to preventing computer crime/**24**

CW at Foac: One speaker gave tips on buying and installing local-area networks . . . Electronic mail and electronic funds transfer pose a security threat, experts warned/**26-27**

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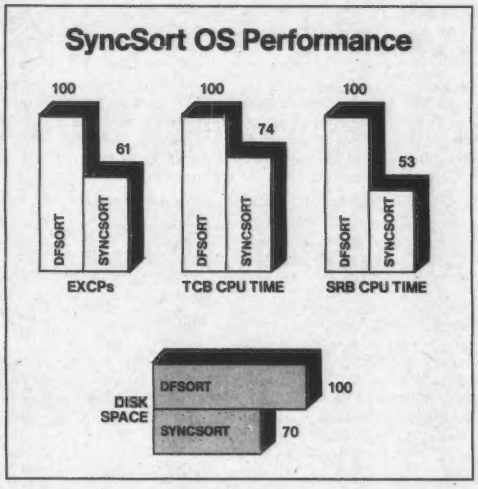

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Early user harbors ambitious plans for IBM's DB 2

FIRST USER

By Paul Gillin
CW Staff

The Buick Motor Division of General Motors Corp. is plunging headfirst into relational data base management, and its product of choice is IBM's DB 2.

With more than 20 months of DB 2 experience under its belt, Buick is ready to start using the data base management system (DBMS) on some ambitious applications (see story below). "I think DB 2 will get a serious look from now on for every application," said Lowell Watson, administrator of new technology studies at Buick.

The first release of IBM's long-awaited relational DBMS has some shortcomings, Watson said, but he is largely pleased with both its performance and features. "We're happy with it. The code is clean, and it's very good for such a young system and a large system," he said.

DB 2 has the greatest potential for prototype development of end-user-type applications that require frequent query and report writing. "Programming productivity is definitely up," he said. "You have more interaction with the customer, and at the end, you're much more likely to have something he's happy with than in the traditional life cycle approach. It's much more forgiving [than IBM's IMS] in the way you put the data base together."

However, he said, Buick is not planning to move any major applications to DB 2 from IMS in the foreseeable future.

The focus of DB 2 usage at Buick is a large production program used by the personnel department to handle sickness and accident claims. The system tracks claims and actions taken on those claims and maintains a six-month history file of time and attendance data. It also has extensive query facilities using the Query Management Facility utility of DB 2 and includes a tickler file for claims analysts. Written largely in PL/I, the program uses files extracted from three IBM Vsam data bases loaded into a fourth production file that is maintained solely on DB 2.

Currently, the time and attendance data base consists of 1.5 million records. When the history file is complete, it will comprise about 2.5 million records. "So far, we're confident it can handle this application up to 2.5 million rows. We are getting 3 to 5 second response times," Watson said. However, he stressed, "You have to remember we're not updating that table. It's just being queried by the applications program or by the user."

Examining DB 2 limits

Buick is bound by a nondisclosure agreement not to discuss specifics of DB 2 performance, but Watson said, "We are working heavily in that area. We're trying to figure out how far we can push [DB 2]," he said.

"Performance has to be worked on and IBM knows that," he said. "IBM will tell you that in the first release they did not work on performance. The main thing was to make the code clean and make it do what they advertised. They're saying the next release is going to concentrate on performance."

The biggest area of concern is in updating. Watson said Buick has not tried updates on tables larger than 100,000 records. However, "It's clear we can handle all that stuff down in the hundreds of thousands," he said.

So far, extracts have come primarily from Vsam files using IBM's DXT data extract facility. "DXT is a pretty good extracting tool for getting data out of Vsam or IMS or other kinds of data collections if the data is laid out flat," Watson said. "The language you use is a Sequel-like language. It picks data up with great selection. However, when it lays it down, there are no choices you can make about how the updates are done. So in some cases, we have to write some PL/I programs where we have to do some more selective kinds of updates."

Buick had considered several fourth-generation languages in its initial foray into relational processing. But Watson said the relative weakness of the data base handling was a factor against them. "We were looking for something more fundamentally different and structured, not the best report writer on the market," he said.

DB 2's use of SQL was a major factor. "I've been trying to convince other people that it's best for the whole industry to standardize on a language," Watson said. "[SQL] looks like a reasonable standard, and IBM will make it a standard anyway. Why go off on one of these tangents for a while and then come back?"

Once inside DB 2, Sequel Processing Using File Input (Spufi) can be used by programmers in application development to insert data base queries. "If you're writing a program in PL/I and you're editing the file, you can split-screen to your Spufi session and then write the query that you think is appropriate to be included in your program," he said. Buick uses Spufi in an IBM Interactive System Productivity Facility environment for DB 2 development.

Watson said DB 2 has imposed no limits on the variety of record types that programs can use. "You cannot support a one-bit kind of record type that you could in PL/I," he said. "But you have fixed-length character, variable-length character, packed, small integer and float. Most of the data types you have in PL/I you have in DB 2."

Watson said DB 2 is a good first release but needs some enhancements. Buick presented a large document of proposed additions and modifications to IBM at a customer roundtable last year. Watson said IBM appears to be tackling most of the significant needs that were expressed.

Integrated engineering next project for firm's DB 2 system

Bigger applications are on tap for IBM's DB 2 data base management system (DBMS) at the Buick Motor Division of General Motors Corp. According to Lowell Watson, administrator of new technology studies at Buick, the next large application will involve integrating engineering functions with other parts of the business.

"When we build a car, from design to prototyping, there's a lot of information that needs to go around to different people," according to Watson. "We'd like to compress the amount of time it takes to engineer and build a car."

Watson explained that it currently takes Buick about five years to move a car from initial design to market. "We'd like to get that down to three years," he said. "To do this, we're looking at simultaneous engineering. Instead of designing a car and then throwing it over to manufacturing, we want manufacturing in on all the information from the beginning so we can move it through the plant more quickly."

Watson said the IBM IMS-based information system that is in use now is not oriented toward moving information across departmental boundaries. "It's difficult to do that with IMS," he said. "What you end up doing is replicating part of the system and duplicating data. You end up with integrity problems, several different data bases that don't agree, and the communication effort breaks down."

A DB 2-based application could be used to extract engineering information and make it available for query from the different functions. Watson said that development of the system, which will be much larger than anything now used under DB 2 at Buick, should begin when the status of the engineering departments becomes more settled after GM's recent reorganization.

Want to stay competitive? Add chief information officer

CHICAGO, Ill. — Chief executive officers and chief operating officers who want to remain competitive will have to incorporate a new title into their management system, according to Arthur Andersen & Co.

In a handbook for executives entitled "Trends in Information Technology: 1985," the accounting firm predicts that the emergence of the chief information officer at the top executive level is essential to survival.

"The corporate role in establishing an information infrastructure and in setting policies and standards for its use must increase," said P. Declan O'Riordan, a senior partner who directed the preparation of the executive handbook.

"With the decentralization of the traditional MIS group, new systems development methods and the rapid convergence and overlapping of technologies, one senior official should be able to correlate information technology and business strategy for the organization's advancement," O'Riordan said.

Along with the emergence of the information executive, the firm predicts an increase in the use of information systems as marketing tools.

Arthur Andersen plans a monthly update of the free handbook which can be obtained at any local Arthur Andersen office.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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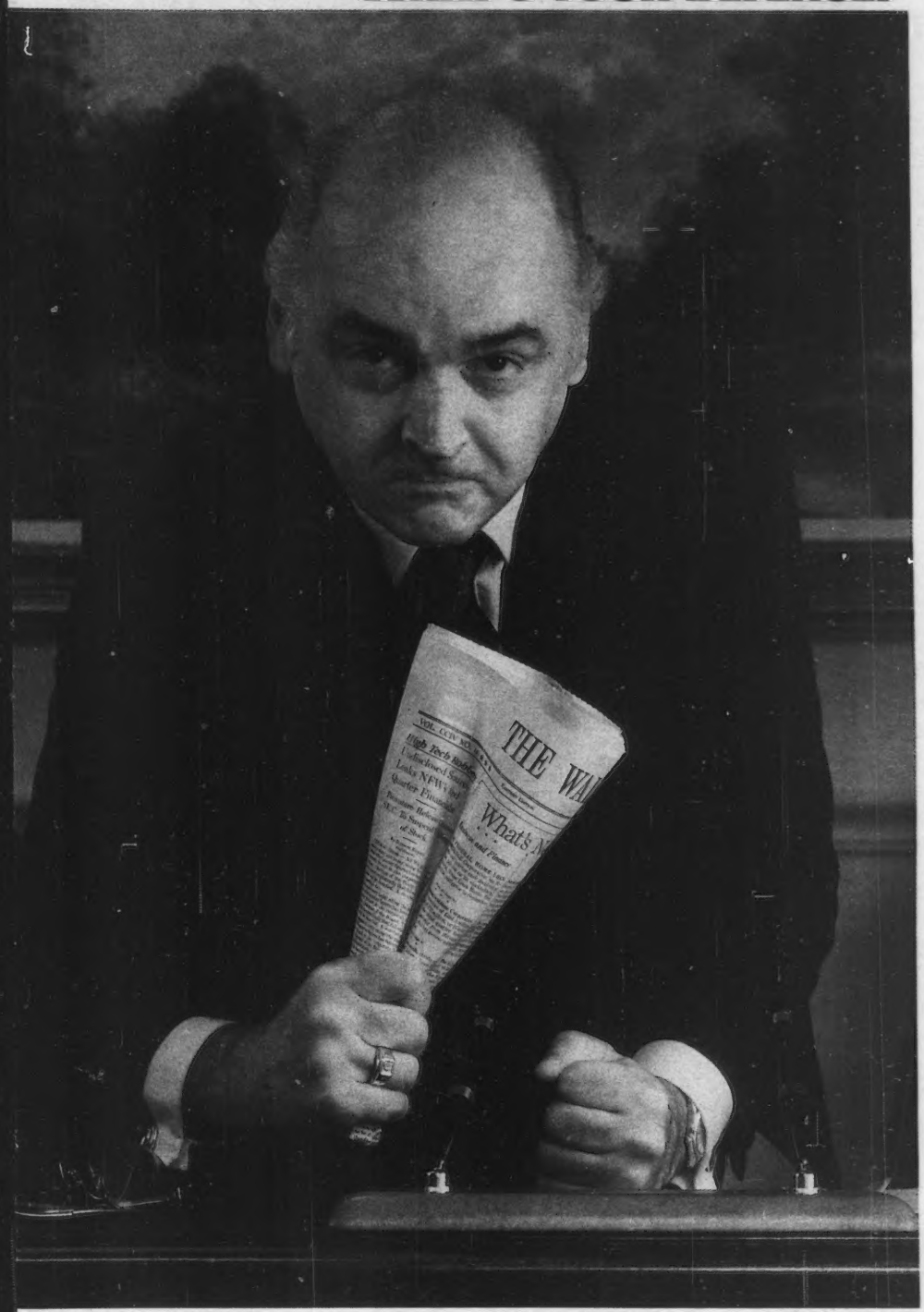

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NEWS

Lotus offers software for Apple's Macintosh

Jazz package targets corporate users; functions resemble Symphony's for IBM's micro

NEW YORK — Lotus Development Corp. introduced last week its Jazz five-function integrated software package for the Apple Computer, Inc. Macintosh in a move designed to entice corporate users to embrace Macintosh.

Jazz reportedly offers functions found in Lotus' Symphony package for the IBM Personal Computer, including word processing, spreadsheet, data base management, communications and business graphics, but Lotus Chairman Mitchell D. Kapor stressed that Jazz is "in no sense a rework or expansion of [Lotus'] 1-2-3 or Symphony."

Priced at $595, Jazz will reportedly be available in March 1985. It will run only on the 512K-byte version of the Macintosh, introduced in September, and requires a second disk drive, priced at $495.

Jazz reportedly allows users to execute functions using the pull-down menus common to Macintosh software in conjunction with either the machine's keyboard or the Macintosh mouse. Each application is said to function either as a stand-alone program or as an integrated, and even windowed, program within other applications in the package.

For that reason, Kapor refused to specify how much internal memory the program occupies, saying "how much room you have is a function of what [application] you're doing with it."

Jazz's communications program reportedly supports Digital Equipment Corp. VT100 and VT52 terminal emulation and can also convert Multiplan, 1-2-3 or Symphony files, transmitted from the IBM Personal Computer to the Macintosh, into a format that Jazz can use.

> *'Macintosh has had zero momentum in the corporate marketplace, but Jazz will make [the Macintosh] a more attractive offering without a doubt.'*
> — Tony Morris, Morris Decision Systems, Inc.

Calling Jazz a product "for the forgotten managers of business, for those users who are not spreadsheet junkies," Apple Computer President John Sculley told the 200 or so who attended the introductory press conference that Jazz will come to have the same impact as Software Arts, Inc.'s Visicalc and Lotus' 1-2-3.

Financial analyst Scott Smith of the Gartner Group, a market research firm in Stamford, Conn., meanwhile, acknowledged that Lotus is "positioning [Jazz] very strongly for the corporate world," but wondered if corporate users really want integrated packages at all.

The cafeteria approach

His firm's research, he said, shows they prefer what he called "the cafeteria approach" of chosing selected software applications that can share data, particularly in a windowed environment.

"The [Macintosh] is out of the woods," as far as sales to corporations go, said retailer Tony Morris in reaction to the announcement.

Morris, whose New York-based Morris Decision Systems, Inc. sells personal computer hardware and software solely to corporate clients, said that, so far, "Macintosh has had zero momentum in the corporate marketplace," but that Jazz "will make [the Macintosh] a more attractive offering without a doubt."

COBOL from page 1

"When I had a choice in the past, I have always gone toward a scientific language like Fortran or Algol. I developed a strong anti-Cobol bias. But I'm surprised and satisfied with Cobol-80. We've been able to do everything we wanted to do."

Users said Cobol-80's new EVALUATE verb, which allows for testing of multiple conditions and specification of multiple control branches, has been one of the most helpful features of the new implementation.

"We've found that after you get past three levels of IF statements, nobody can keep up with where you are," Sprawls said. "EVALUATE eliminates having to write a lot of IF statements."

O'Connor said the EVALUATE statement has enhanced readability and maintainability of Cobol code. "It's also very economical of characters," he said. "Because of built-in control, I can use selection alternatives and not have to bury them in a bunch of IFs and GOTOs."

The new procedure cuts down on the complexity of debugging programs containing many IF statements, Sprawls said. Previously, a single period could end a series of nested IF statements. In Cobol-80, internal IFs can be ended with an END statement without affecting external IFs. "If it's [3 a.m.] and your payroll's down, it can drive you crazy looking for that little period," he said. "That's been eliminated in Cobol-80."

Users said EVALUATE and in-line PERFORM are so useful that they rewrite Cobol-74 programs whenever possible to take advantage of the new statements. "When you PERFORM a section, it executes a whole section of code," said Nancy Torok, a programmer/analyst at Amax Copper, Inc., a metals trading company in Carteret, N.J. "That makes it easier to document."

A particularly useful new feature for Amax's shop has been the advance ACCEPT and DISPLAY commands. The DISPLAY statement now can be used to display a message and add a new phrase at the end with no advancing.

Control over prompts

"The old system was a prompt and response mode that proceeded line-by-line," Torok said. "In this new way, you can choose how you want the prompt to be displayed, specifying lines and columns. That's useful for prompting on data input screens. Now you can do that in a full-screen mode."

Sprawls has found the new PERFORM WITH TEST AFTER statement to be useful in eliminating problems caused by unfinished subroutines. If any subroutines are accidentally left open, they are closed when the program is exited. "That was a real 'gotcha' in Cobol-74," he said. "I'd say 20% of the bugs I've run into have related to a flag that hadn't been cleared."

Two users found the new REFERENCE MODIFICATION statement useful because it allows individual characters within a string to be accessed from the procedure division without having to be defined in the data division. "This feature is invaluable to us," O'Connor said. "In effect, it allows us to treat substrings of long fields just as if they were part of a standard reference definition. The reference-modified fields are indistinguishable from regular fields."

Nesting whole programs

Cobol-80 also contains new procedures for nesting whole programs, a feature that can be used to construct more modular and maintainable applications, users said. When this is combined with VAX VMS features, "you can write a large system with a lot of program modules that call each other and bind on the fly into one image," Sprawls said. "It makes it possible to write applications in a very modular form."

O'Connor said the capability provides the means to share data and pass parameters between calling and called programs.

"Complete programs can be contained in other programs and also executed as separate programs," he said. "They behave as independently compiled programs although you keep and maintain them as a single unit."

Users unanimously said they had experienced few problems in running existing Cobol-74 programs on the new compiler.

"If you want to write Cobol-74 using the Cobol-80 compiler, you can do it. There's even a flagger that will show you where you're departing from it," Sprawls said. "But if you do so, there are a lot of new and great things available now that you will be missing."

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WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

VA program identifies benefits overpayments

WASHINGTON, D.C. — The Veterans Administration (VA) this month began a computer matching program to detect overpayments of veterans, benefits, such as pensions and educational aid.

The VA Inspector General's Office said it will match its benefit records with vital statistics records kept by 47 states (three states lack automated records) to "identify recipients who may be ineligible or not fully entitled to such benefits." For example, the VA noted that the spouse of a disabled or deceased veteran is not entitled to full benefits in the event of a divorce or remarriage.

In other recent announcements required by the Privacy Act of 1974, the government said:

- The Federal Bureau of Investigation's National Crime Information Center will routinely disclose information about missing children to the National Center for Missing and Exploited Children.
- The U.S. Department of Energy will routinely disclose health information about employees handling radioactive materials to the National Institute of Occupational Safety and Health for studies on radiation exposure.

Florida residents to test OMR 1990 census forms

WASHINGTON, D.C. — The U.S. Bureau of the Census plans next year to test census forms that can be read by optical mark recognition (OMR) scanning equipment in an effort to evaluate automated processing methods for the 1990 census, according to Census Bureau documents.

The bureau said it will test the OMR census forms in March 1985 in Tampa, Fla., as part of a pretest for the nationwide census in 1990. Eighty percent of the Tampa households sampled will fill out the OMR form, while 20% will use the regular census form that requires clerical data entry for computer tabulation.

The OMR form requires respondents to use a No. 2 lead pencil to blacken circles corresponding to the correct answer.

Air Force plans AI system to diagnose aircraft ills

WASHINGTON, D.C. — The U.S. Air Force plans to develop a prototype artificial intelligence system for aircraft maintenance that is expected not only to assist with repair diagnosis, but also to help train new mechanics, officials announced recently.

The announcement from the Training Systems Division of the Air Force Human Resources Laboratory at Lowry Air Force Base in Colorado said the research project will develop a diagnostic expert system with features that would help apprentice mechanics learn the problem-solving techniques of master mechanics.

The Air Force plans to award an R&D contract next summer. "The goal of this research is to design, develop, demonstrate and [make the transition to] artificial intelligence technology, which integrates automated diagnostics, maintenance technician expertise and maintenance information data bases," the statement said.

The system would draw on data bases generated by a computer-aided design and manufacturing system as well as the heuristic knowledge of expert technicians, according to the announcement.

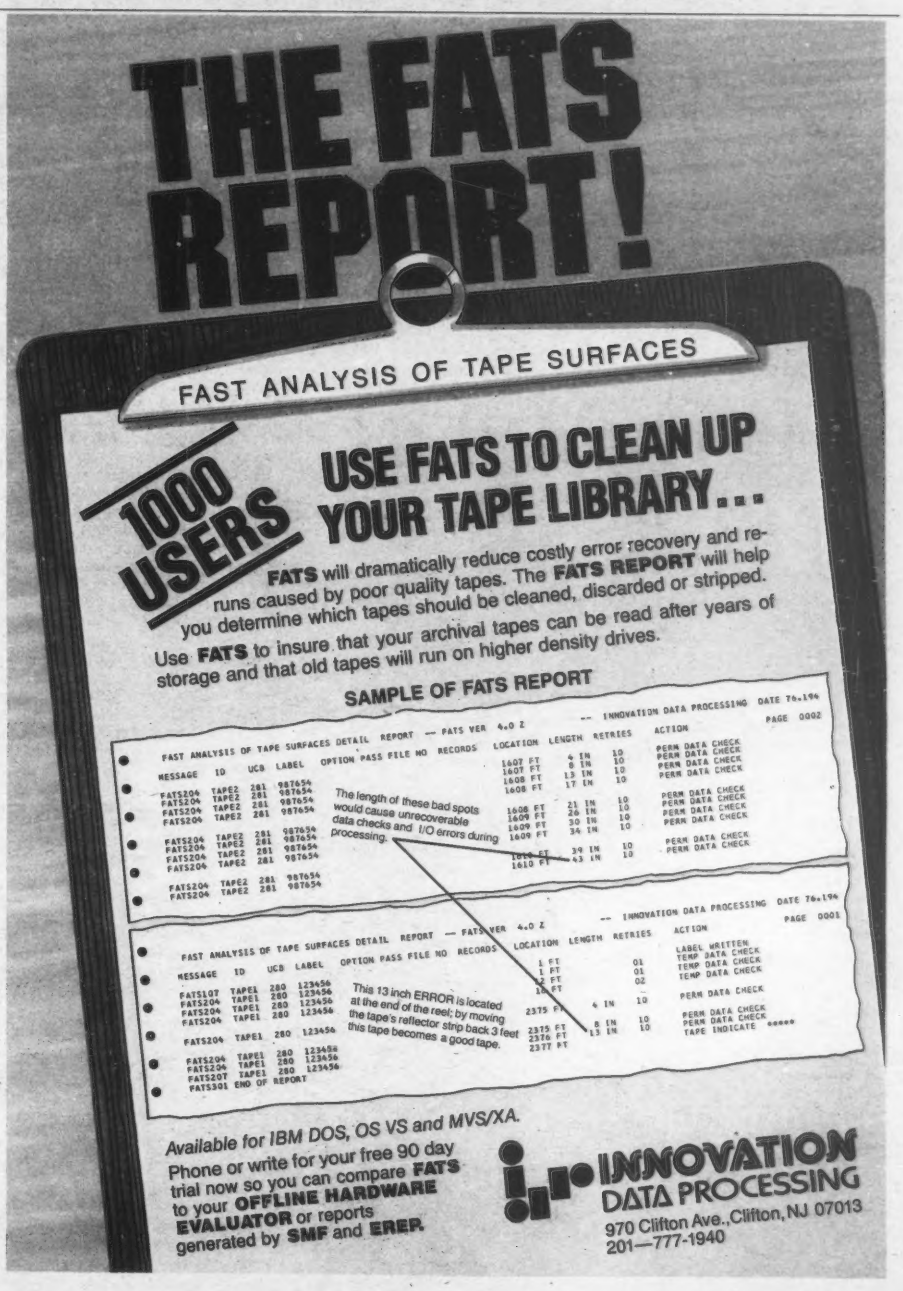
AT&T exec to address conference

BALTIMORE, Md. — Donald Procknow, vice-chairman of AT&T Technologies, Inc., will deliver the keynote address — entitled "Doing Business Electronically" — when the World of Electronic Data Interchange — 1984 Forum and Exhibit convenes at the Convention Center here Nov. 28 and 29.

The conference, sponsored by the Transportation Data Coordinating Committee (TDCC), will focus on the latest developments in computer and communications applications that use the Electronic Data Interchange standards for computer-to-computer transmission of intercompany business transaction data. The sponsor said industry standards and the transmission and receipt of purchase orders, invoices, bills of lading, freight bills, warehouse instructions, shipment status and payment claims will be discussed and demonstrated at the conference.

Other scheduled speakers will include R. W. DeSio, director of IBM's Corporate Technical Institutes, and Dr. James Boren, president of the International Association of Professional Bureaucrats. The conference will also feature 16 technical clinics covering topics on planning, programming and the implementation of modern electronic data interchange systems.

Conference registration is $295. TDCC headquarters is at Suite 606, 1101 17th St., N.W., Washington, D.C. 20036.



DP operations managers lead in salary gains

GARDEN GROVE, Calif. — Data processing operations managers are experiencing an increased salary differential this year over other operations managers, indicating "a much higher level within the management hierarchy than previously," according to a forthcoming survey by the Association for Computer Operations Managers (Afcom).

The 1984/1985 Data Processing Salary Survey, based on data from about 180 computer installations nationally, reveals that the salary gap between the DP operations manager, a relatively new but emerging position, and the computer operations manager increased from 16.7% last year to 22.8% this year.

One reason for the increase, according to Afcom President Leonard Eckhaus, "is that a number of data centers across the country are reorganizing their operations, incorporating the position of data processing operations manager."

While DP operations shops were traditionally run by the computer operations manager, the newer position indicates the top DP operations person is now at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers in many companies, according to Afcom.

Salaries for data entry managers and data control managers closed the gap somewhat with the traditionally higher salaries for computer operations managers, a spokesman for Afcom said, indicating "a movement towards more of an equalization of the salaries" for managers grouped under the DP operations manager. The total spread between salaries for data entry, data control and computer operations managers dropped to 21.9% in the most recent survey, from 31.5% a year earlier. Afcom cautioned that "one year's data does not in itself represent a trend."

The top DP operations person is at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers.

Nationally, the monthly salaries for DP operations managers ranged from a low of $1,680 to a high of $7,083. The average monthly salary was $3,301 and the median monthly salary was $3,250.

Regionally, DP operations managers earned a higher average monthly salary in the Northeast, $3,433; followed by the West, $3,310; South, $3,183; and Midwest, $3,128.

Computer operations managers nationally earned from a low of $1,358 per month to a high of $6,256, with an average of $2,547 and a median of $2,434. Regionally, average monthly salaries were highest in the West, $2,747; followed by the Northeast, $2,609; South, $2,367; and Midwest, $2,217. Median salaries were essentially equal in the Northeast and the West.

Data control managers salaries nationally ranged from a low of $1,284 per month to a high of $3,800; the average salary was $2,229 and the median salary was $2,277. Regionally, the average salary was higher in the West, $2,402, than the Northeast, $2,210, but the median salary was higher in the Northeast at $2,385 compared with $2,264 in the West. Average salaries for the other areas were $2,268 in the Midwest and $2,193 in the South.

Monthly salaries for data entry managers ranged nationally from a low of $1,000 to a high of $3,800; the average was $1,989 and the median salary was $1,900. Regionally, the average salary was highest in the Northeast, $2,021; followed by the West, $2,014; South, $1,978; and Midwest, $1,838. The median salary was slightly higher in the Midwest than the South.

Projected salary increases for 1985 averaged 7.5% for DP operations managers, 7.0% for computer operations managers, 6.9% for data control managers and 6.4% for data entry managers.

Data entry staff largest gain

Overall salary increases for all employees in the DP shops rose 7.8% over the previous year, according to Afcom, with the largest increase among data entry employees, 9.2%, followed by data control employees, 8.7%, and computer operations employees, 8.0%.

Of 19 job classifications included in the survey, DP shops reported some difficulty in recruiting for 11 of those classifications. The greatest difficulty was filling the position of scheduler, which was cited by 89.9% of the survey respondents. Other positions were: DP operations analysts, cited by 80%; DP operations manager, 75%; senior computer operator, 68%; data control manager, 66.7%; and data control shift supervisor, 66.7%.

The survey, which also breaks down salaries by installation size and for all 19 job classifications, is available for $40 from Afcom, Suite 201, 11501 Brookhurst, Garden Grove, Calif. 92640.

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SAVE from page 1

releases of the applications in much less time.

Ary's group administers the company's Software International Corp. applications, including general ledger, fixed assets and accounts payable. Other groups within North American Philips perform similar functions for a Uccel Corp. Carms accounts receivable system and Insci Corp.'s payroll and human resources software.

The arrangement works like this: North American Philips maintains two IBM 3081 mainframes running IBM's VM operating system at its New York data center. The data center also runs 14 copies of IBM's DOS operating system under VM, as well as a copy of IBM's OS operating system. The widely scattered divisions of North American Philips each maintain their own IBM mainframes, but without any copies of the applications running locally.

Instead, the New York data center maintains core image, source statement and relocatable libraries of the applications at the New York site. When a division wants to update its financial files, it downloads a runtime module of the application over leased or dedicated lines to its mainframe for on-line data entry.

When the update is completed, the data goes through a monitor that Philips wrote in Cobol. The monitor is basically a data collection utility that takes the update data and creates the IBM JCL for batch update. "The user doesn't have to figure out what to run and in what order," Ary said. "The conversion program takes that over for him."

The batch updates are done directly into the user's data base, which is maintained locally. In this way, the users own their data, but not the applications needed to use it. Users do run some of their own applications locally, but the "bread and butter" financial data is all handled through the remote linkup.

Ary explained that the procedures ease the process of converting to new versions of the applications software. But because 19 divisions will use the package, the new releases must be tested much more thoroughly. "If something isn't tested very well, it can bring everyone down," Ary said.

North American Philips uses an internal beta site approach. When a new release comes in, it is tested using a copy of production data extracted from the chosen beta site. The software is then retested against a file of errors that have been found in the past.

Then the beta test site is brought up on the production system under the administration of the application support staff and runs for 30 to 60 days. A duplicate global library containing the new version of the software is kept and run parallel with the previous version. Moving a division over to the new release is as simple as switching pointers, Ary said.

The divisions are notified well in advance of conversion to a new release, Ary said. Staff members from the application support group travel to the divisional locations to train users in the new features of the software. "The easier we can make the system for the users, the happier they'll be," Ary said. "We want the users to know something about data processing, but as little about the complexities of the system as necessary."

User, DP cooperation key to package's productivity

CW AT SI USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — When installing a new financial application package, "the real concerns are not the big heavy technical ones. They have to do with people working together."

That was the essence of a presentation by Carl Coulter, a systems planning consultant in corporate business systems development at McGraw-Hill, Inc. in New York, at the 15th Software International Users Group Conference held here last week.

Coulter, who has been involved in several installations of packaged software, said a financial software installation project differs markedly from that of standard DP applications. "General ledger is very much an accounting system, and the goals of those people in accounting often don't coincide with the goals of DP," he said.

'My system,' not 'your system'

A major goal of the DP staff should be to have the user referring to the application as "my system" rather than "your system" by the time development is well under way, Coulter said. For that reason, the user should drive the process throughout the life of the development cycle.

Perhaps the most important commitment corporate management must make is in the area of personnel. "Accounting people tend to think all you have to do is push buttons and things happen in DP," he said. "It's hard to believe people think you can make a conversion without increasing the people commitment. Your management has to understand the resources you need to install or convert."

Coulter said that when he was at Home Box Office (HBO), a division of Time, Inc., the manager of accounting held weekly meetings to check on the progress of an accounts payable and general ledger installation effort.

"If we needed people, he made sure they were available," he said. In return, DP was expected to meet the accounting department's ambitious deadlines.

Both the user and the DP sides of the project management team must define their roles and stick to them without attempting to do the other department's job, Coulter said.

- DP should develop the conversion plan, identifying interfaces from other financial systems and setting realistic time frames.
- It should interact with the user decision-makers. "This is key," Coulter said. "It's very important to know who makes the decisions, who pays the tab and who expects results."
- It is also up to DP to maintain a relationship with the software vendor that enables the user company to take advantage of the vendor's services when needed.
- DP must install and test the software, making sure all documentation and instructions are present and that the software is installable.
- DP must bring the system to operational status.

To make the last two steps easier, do some up-front planning, Coulter said. Set standards for job control language (JCL) and do not modify JCL at first. "You want to make sure the package is installable," he added. Retain identification codes for programs and job streams that are similar to those used by the vendor. That makes error tracking easier than if entirely different identifiers are used, he explained.

One should also bring the system into operation in line with the needs of the user, Coulter indicated. The user may want to build a history file by converting existing data or simply by starting fresh, he added. Building interfaces to existing systems and methods is important in order to bring data over that is in line with the user's expectations.

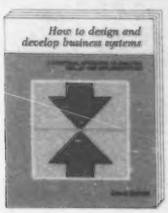
Coulter

Users, for their part, should be responsible for training their own people, according to Coulter. They should create their own report formats. At HBO, users hired two consultants strictly to build reports. Users will want to define their own control and security systems and should plan for conversion so that it dovetails with the expectations of DP, he said.

In addition, users must be solely responsible for defining their own chart of accounts and relationships and for deciding how data should be captured and maintained, Coulter added. All these steps should be taken without extensive DP involvement. The user will not feel he owns the system unless he has defined in detail how it will work, he explained.

According to Coulter, the end result of coordination between DP and user departments is reduced personnel costs, which are by far the most expensive aspects of installation or conversion.

For anyone who has anything to do with the development of business software...



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Planning keeps package running problem-free for years

CW AT SI USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — Donald Willis has never had to grapple with the "make or buy" decision of application software during his 13 years at the Capital Group, Inc. in Los Angeles. Willis, who is manager of corporate accounting, joined the Capital Group in 1971 when the company was in the middle of the process of installing a general ledger package from Software International Corp. (SI).

Thirteen years and four major releases later, Willis is still an advocate of packaged software. The choice seemed natural for the Capital Group in 1971 as it entered a period of aggressive growth. The packaged solution offered faster installation than an in-house-developed system and greater flexibility than any alternative, he said in an interview at the 15th Software International Users Group Conference held here last week.

The Capital Group is an investment management and research company that owns several other subsidiaries worldwide. Subsidiaries include Capital Research and Management Co., Capital Management Services, Inc., Capital Guardian Trust Co. and international affiliates in Europe. An IBM 4381 computer at the company's Brea, Calif. headquarters processes virtually all corporate financial accounts. Individual customer accounts are maintained by a service bureau.

The packaged application has operated so smoothly that Willis said it ran virtually maintenance-free between 1972 and 1981, when the Capital Group converted from Version 3 to Version 4 of the general ledger package.

The secret lies in the fact that 13 years ago some very astute accountants did some very careful planning, he said. "If you think it out on the front end, [the package] should serve you for years and years," he said.

Unfortunately, a common problem of package installations that many DP departments must fight is the unwillingness of corporate management to acknowledge the difficulties involved. "Management often thinks of a package as if it [were] a lamp," he said. "You should be able to just plug it in and have it work."

The truth is quite the opposite, he said. Installing a software package does not offer much leeway for changes during development. As a result, the package has to be selected and implemented with an eye toward the long haul.

Estimate growth paths

A critical planning element is estimating growth paths, he said. If your company is planning to double in size over the next 10 years, you need a package that allows you to add many new relationships, and logic that will let you customize the software to handle the accounts the way your business handles them.

That effort can also pay off in ease of installing new releases. The Capital Group has been able to bring up new versions of the general ledger over the years with few visible changes, he said. "In some cases the users don't even know the conversion has been made," he said. A key element is knowing the new release before trying to install it.

When implementing a new release, the Capital Group does not use the only copy of its live data. Production data is backed up prior to the change. Conversions should be made during the off-season or during holidays when work is likely to be slow, he said.

Steady contact with the vendor is critical both during conversion and in day-to-day operations, Willis said. "User conferences are one of the best ways I know to meet the vendor," he said.

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Sperry launches 7000/40 32-bit superminicomputer

Machine supports up to 128 users, targeted to compete against DEC VAX-11 superminis

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. last week chose the world's largest microcomputer show as a stage to unwrap a 32-bit superminicomputer supporting up to 128 users and designed to run AT&T's Unix operating system and the C language.

The Sperry 7000/40, announced at Comdex/Fall '84 here, will be manufactured by Computer Consoles, Inc. and will reportedly feature an AT&T Unix operating system and main memory capacity of between 4M and 8M bytes.

Priced between $160,000 and $300,000, depending on configuration, the 7000/40 will also reportedly offer independent processing for instruction decoding, address generation and instruction execution, allowing the system to process three instructions simultaneously. First shipments are slated to begin Feb. 2.

The 7000/40, Sperry officials said, is targeted to compete with, among others, the Digital Equipment Corp. VAX-11 superminis, including the recently introduced 8600 series.

"VAX users who are looking either to upgrade their system or standardize on a VAX Unix product can now have the option of migrating to the Sperry family," according to Dewaine Osman of Sperry's Americas Division.

Initially, the 7000/40 will support the University of California at Berkeley Unix 4.2 operating system, but Sperry's director of microsystems and commodities marketing, Neal Waddington, said that by mid-1985, AT&T's Unix System V will also be available.

The former operating system will make the machine attractive to the scientific market, while the latter — which provides IBM interconnect ability — will enhance its appeal to commercial users, Waddington observed. Berkeley Unix 4.2 for the 7000/40 will be priced from $10,000 to $22,500, depending on the number of users.

Other features of the 7000/40 are a separate subsystem for the CPU, main memory and I/O and four-way interleaving of its memory capacity, said to permit several controllers to access memory simultaneously.

Sperry Corp. can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Apple's Sculley: Innovation will shake micro doldrums

CW AT COMDEX/FALL '84

By Edward Warner
CW Staff

LAS VEGAS — Abandoned by investors and shaken by the shakeout, the personal computer industry is trapped in a giant rut that it can escape only through innovation, said Apple Computer, Inc. President John Sculley in his keynote address opening the Comdex/Fall '84 show here.

Sculley

That innovation, Sculley indicated, will come from the software world because the personal computer has "begun the transition from a hardware machine to a software appliance."

Contributing to the industry's rut, the Apple chief said, is the fact that the shakeout of microcomputer hardware makers has now expanded to include software publishers and makers of computer peripherals. To get the industry back on track, he added, innovation will be needed, and "innovation must be market-driven to be successful."

Sculley, who joined Apple a year and a half ago, also had some thoughts to share about innovation as it pertains to his firm's continuing battle with its Big Blue nemesis. When told shortly after his arrival that Apple should seek IBM compatibility or a non-IBM dominated market niche, Sculley said he responded, "I get my satisfaction from being a dreamer, a builder and a leader."

He later remarked that IBM compatibility will become harder and harder to achieve, citing as evidence the arrival of the IBM Personal Computer AT and the announcement of IBM's upcoming Topview windowing environment.

Sculley argued, however, that size is not enough to ensure success, pointing to the minicomputer makers and AT&T, which he said are not providing the leadership needed in the industry.

While not mentioning his firm by name, he said the leaders of the personal computer industry "will not resort to mass merchandising, but will work with their dealers as partners."

In his speech, Sculley blasted the venture capital investment community, which he said "has turned away from the biggest growth industry."

SPERRY from page 1

access memory and a 10M-byte hard-disk storage unit and will cost $395.

Also introduced were versions of Unix for the Series 5000 supermicros and the firm's new Series 7000/40 superminicomputers (see story above).

Until now, "You haven't seen a mainframe-to-micro company making such a financial commitment to Unix," claimed Dewaine Osman of Sperry's Americas Division.

Four models offered

The Series 5000 supermicros, meanwhile, will be offered in four models, reportedly supporting from eight to 64 users and offering processing at a rate ranging from .7 millions to 3.2 millions of instructions per second.

The machines, based on the Motorola, Inc. 68000 CPU, will reportedly offer dual bus design and a separate processor/memory technique that provides error checking and correction.

Series 5000 supermicros will be priced from $15,000 to $50,000 for the low-end 5000/20 and 5000/40 models and from $62,000 to $150,000 for the high-end Models 5000/60 and 5000/80. Shipments of Models 5000/20 and 5000/40, being manufactured for Sperry by NCR Corp. and two other firms, will reportedly begin at the end of January 1985, while shipments of the Models 5000/60 and 5000/80, being manufactured by Arete Systems Corp., are not scheduled to begin until March 8, 1985.

Unix System V for the Series 5000 machines will be priced from $1,250 to $22,500, depending on the number of users.

Sperry's Series 5000 announcement was accompanied by the unveiling of office automation and factory automation software packages for the line.

The integrated office automation package, Q Office, is said to offer word processing, spreadsheet capabilities, data base manipulation and graphics. It is priced from $3,500, for the 5000/20, to $20,000, for the 5000/80 64-user system.

Sperry's Manufacturing Business Solution (MBS) factory automation package runs under Unix on both the Series 5000 and on the 7000/40 supermini.

MBS is said to be an on-line MRP-II manufacturing control system with integrated financial applications, including transaction history, actual-cost to standard-cost variance reporting, year-end material and financial rollover functions and password security.

Terminals announced

Also announced at its Comdex press conference were two terminals that the firm said would be most appropriate in a Unix environment — the SVT 1210 and SVT 1220. The SVT 1210, priced at $695, reportedly provides green-screen display and Digital Equipment Corp. VT52 and VT100 terminal emulation. The SVT 1220, priced at $795, reportedly emulates the DEC VT220.

Citing one projection that estimated sales in excess of 2.5 million Unix systems by 1988, Sperry's Osman said his firm "is positioned exceptionally well to take advantage of this Unix growth potential" and that such emphasis would help the firm move away from relying on its mainframe line as its primary source of revenue.

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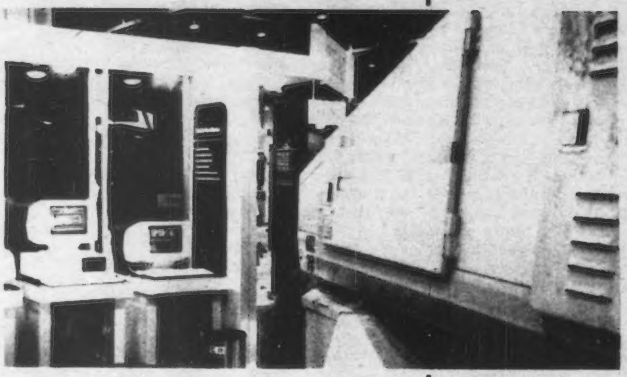

Comdex/Fall '84:

Setting the stage

Photos by David L. Waite

Managers go to Comdex for micro news

CW AT COMDEX/FALL '84

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — For microcomputer managers, the Comdex/Fall '84 conference, held here last week, represented the opportunity to stay a step ahead of the continuing explosion of technology and products in the personal computer industry.

"Generally, we're here because we're trying to stay a little bit ahead of the curve," said Roger G. Neaves, vice-president and general manager of data center planning for San Francisco-based Wells Fargo Bank. Neaves was one of several micro managers interviewed by *Computerworld* at the start of the show.

"We are trying to avoid getting buried," Neaves added. Neaves said he and Raymond E. Potts, who serves as his assistant in the data center planning division, planned to walk through the entire show, which this year included 1,400 exhibitors spread out among six major facilities.

"If anything catches our eye, we'll stop and look at it," Neaves said. Neaves and Potts, who oversee the purchase of computer equipment for Wells Fargo — from personal computers to mainframe systems — said Comdex gives them the chance to accomplish several tasks at once.

The two planned to check out new products at the request of their end users who had asked about software programs that had been announced. Neaves, who pointed out that some companies in the personal computer industry have had problems delivering a product after announcing it, said Comdex would give him the chance to confirm whether new products "were alive and well" or were simply "vaporware."

In addition, Neaves and Potts said they would be investigating current offerings in the local-area net market for Wells Fargo, which has installed close to 900 personal computers in its offices throughout California.

For large organizations that have made a commitment to personal computers, local-area networks represent the "obvious next step" in making the machines more productive and more useful, Neaves said.

Neaves and Potts cited other interests as well, saying they would be looking for dumb terminals to hook up to IBM's recently announced Personal Computer AT, as well as multifunction boards for the machine.

In addition, the two said, they are now wrestling with the issue of data security and would be paying attention to exhibitors who offered products in that market.

Steven Hochberg, vice-president of Complete Technology Corp., a Flint, Mich.-based firm that acts as a microcomputer consultant to Fortune 1,000 firms, said Comdex would give him the chance to stay "one step ahead of users."

While most users help micro managers decide which products will be used within an organization, the microcomputer manager must stay on top of the changing technology, new products and new buzzwords, Hochberg explained.

Hochberg, who said Complete Technology has installed approximately 60 personal computers in its own offices, said he would be looking at a variety of products at Comdex, including printers, micro-to-mainframe link packages and project management software.

Unlike Neaves and Potts, Hochberg said he would not be focusing on developments in the network market while attending Comdex. Although Hochberg said he was interested in the technology, he did not expect any significant announcements in local-area nets at this year's show.

Hochberg said most of his firm's users were satisfied with their basic applications software packages, so he would not be looking at new programs. Instead, he said, he was interested in software productivity tools, such as Topview, IBM's recently announced operating environment.

"Management is crying out for some type of system where users can get on a computer and hunt and peck their way through several software packages under their own menu system," he said.

Hochberg said he planned to take a look at Topview, which is said to provide a windowing and multitasking environment for applications software.

COMDEX from page 1

software offerings and dozens of personal computer and multiuser micro system debuts. It also placed a considerable emphasis on communications links.

Among major Comdex developments, Sperry Corp.'s Information Systems Group unveiled plans to put AT&T's Unix on a broad line of products (see story page 1). Texas Instruments, Inc.'s Pro-Lite laptop computer (see story page 57) and Lotus Development Corp.'s Jazz software for the Apple Computer, Inc. Macintosh (see story page 6), also gathered crowds.

In other software moves, Ashton-Tate introduced upgrades of its Framework, Dbase II and Dbase III application programs that are fully supported by the IBM Personal Computer AT. Updates for current licensees range from $25 to $35 (depending on shipping costs), except for licensees of Dbase II version 2.3 and earlier, who will be charged from $75 to $90. Ashton-Tate is located at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

Microsoft Corp. showed two new applications for the Macintosh, the Microsoft File data management package and the Microsoft Word word processing program. Each will be available by the year's end and will cost $195. Microsoft is headquartered at 10700 Northup Way, Bellevue, Wash. 98009.

Apple itself introduced a 10M-byte hard disk drive for its Lisa, Apple II and Apple III. The Profile system will be available this month for $1,995. Apple is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

Third-party developers also showered the Macintosh with hardware and software products, including a hardware accessory kit that hooks the system to the NEC Information Systems, Inc. Spinwriter letter-quality printer. The kit costs $100 and is available from NEC at 1414 Massachusetts Ave., Boxboro, Mass. 01719.

In networking, the first diskless workstation from a leading vendor of IBM Personal Computer-compatible systems appeared. The diskless version of the Zenith Data Systems Corp. Z-150 is shipping now with a $1,599 price tag, according to Zenith, which is based at 1000 Milwaukee Ave. in Glenview, Ill. 60025.

The show also featured many recent network offerings, including enhancements of 3Com Corp.'s Etherseries software. Etherseries 2.4 products reportedly support the Personal Computer AT and provide a new menu system that boosts security and enables users to custom-design application menus. 3Com also cut prices on software and hardware products from 18% to 70%. 3Com is located at 1365 Shorebird Road, Mountain View, Calif. 94039.

Many multiuser microcomputers running some version of Unix were introduced at Comdex/Fall, along with several other multiuser systems designed to connect to personal computers. In the second category, Televideo Systems, Inc. showed the PM/16T, an enhanced version of its Personal Mini/16 that adds an integral 20M-byte streaming tape drive, 512K bytes of random-access memory, a multiuser version of the vendor's Infoshare operating system and an electronic mail package. The PM/16T will be available in February for $9,995, according to Televideo, which can be reached at 550 E. Brokaw Road, San Jose, Calif. 95112.

Among the host of add-on products for the Personal Computer AT appearing at Comdex, Sysgen, Inc. displayed a 45M-byte cartridge tape backup subsystem. The Qic-File subsystem costs $1,395 for an internal version and $1,495 for an external model, according to Sysgen, which is headquartered at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Comdex also produced several 2,400 bit/sec modems targeted for personal computers. One leading contender is the Hayes Microcomputer Products, Inc. Smartmodem 2400, which is said to provide intelligent transmission controls, voice/data switching and the ability to set communications instructions with keyboard commands. The modem is available for $899 from Hayes, which is located at 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.

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NEWS

Coalition needed to stem computer crime

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime that threatens to engulf the U.S., according to the head of one of the nation's largest public data networks.

J. David Hann, president of GTE Telenet Communications Corp. told visitors at last week's 11th Annual Computer Security Conference here that the responsibility for halting the growing danger of computer crime and computer security violations is a shared one.

Hann said the task of stopping the computer crime wave must be taken up not only by legislators and industry officials, but also by all computer users and "every consumer whose tax and credit records — even medical records — are kept in computers.

"Over the past year and a half," Hann said, "we have seen a lot of media hype and stridency on the part of public lawmakers concerning computer security. But this already enormous problem is still growing. What can we do to stem the computer crime wave?" he asked.

"I believe the problem is solvable," he continued. "I am very optimistic about our future progress in stopping computer crime. A solution is within reach — a solution based on a new level of commitment and cooperation that is growing today. Industry must band together with users and government to find an effective and just solution to the problem of computer crime."

Hann said the current generation of computer criminals — so-called hackers — has been portrayed as bright, adventurous "kids" who utilize public networks to illegally access unguarded systems. But he warned of a far more serious security issue, the rise of a sinister class of criminals who use computers to perpetrate their crimes.

According to Hann's statistics, an armed robbery, on the average, nets the criminal $3,000, and the average embezzlement yields between $19,000 and $25,000. But the average computer crime earns the perpetrator a staggering $100,000 to $500,000, he said.

Hann quoted a June 1984 report released by the American Bar Association's Task Force on Computer Crime [CW, June 18], which showed that fully one quarter of the nation's largest corporations reported verifiable losses due to computer crime. The total value of those losses was reported to be between $145 million and $730 million, which represents an average loss of $2 million to $10 million per respondee.

Billions of dollars lost annually

"If we take this as a representative sampling of other businesses and government," Hann said, "computer theft and abuse costs North American businesses billions of dollars annually."

And, according to Hann, the hackers who pester public networks add to that costly toll — even if they do nothing more than illegally access computer systems. "An alert, determined operations staff is needed to find the very small clues left behind by professional criminals. But the crowds of hackers provide a steady distraction." The youthful hackers prove to be such a distraction, Hann said, that the attention of the operations staff is diverted from tracking down the professional criminals. "So the whiz kids are contributing to the proliferation of serious crime and abuse. Computer trespassing is not child's play even if no harm is done," he said.

GTE Telenet's own Telenet communications network was used by hackers in August 1983 to break into computers in the Nuclear Research Facility at the National Laboratory in Los Alamos, N.M. [CW, Aug. 22, 1983].

What is Hann's system for ensuring computer security in a public data network environment? First, consumers, computer owners, public network operators and government officials must work together to promote legislation that matches penalties to the seriousness of the crimes. In addition, industry officials must take a firm stand on pressing charges against suspected offenders.

As a third step, Hann said public network operators should begin to educate customers on potential security risks and on methods for improving the integrity of their systems. Finally, those operators must enhance the security of the networks by providing security products and services to their customers.

Computer crime bill inadequate

What has GTE Telenet done along those lines? "We have pressed for strong legislation, and we have worked with the [House of Representatives] to draft such a law," Hann said. "The bill that was finally passed this year [CW, Oct. 15], is not adequate to cover the full problem, and it should be reviewed and strengthened in the next legislative session," he added.

Hann said GTE Telenet had also contacted the governors of all 50 states to promote stronger state legislation and has practiced a policy of cooperating with law enforcement officials to prosecute violators. He said the firm has been successful to date in obtaining both indictments and guilty pleas under federal wire fraud statutes.

In addition, he said, GTE Telenet has worked to provide customers with new security products and services, such as public key encryption methods for electronic mail and personal identification number systems to prevent unauthorized access.

Equitable workers win VDT safety clause in contract

SYRACUSE, N.Y. — Clerical workers at a major insurance company here agreed to a labor contract earlier this month that included groundbreaking provisions involving VDT health and safety.

A spokeswoman for District 925 of the Service Employees International Union of the AFL-CIO, said the agreement with the Equitable Life Assurance Society of the U.S. could serve as a future model for protecting employees who work with VDTs.

"What's important here is the breadth of concerns covered in the contract," said Karen Nussbaum, president of District 925 and head of 9-to-5, the National Association of Working Women.

The agreement covers 54 members of District 925 — insurance claims processors and support personnel — who work at Equitable's group benefits office here. Nussbaum said the contract is especially significant in that it involves a private company in an industry that has been difficult to unionize.

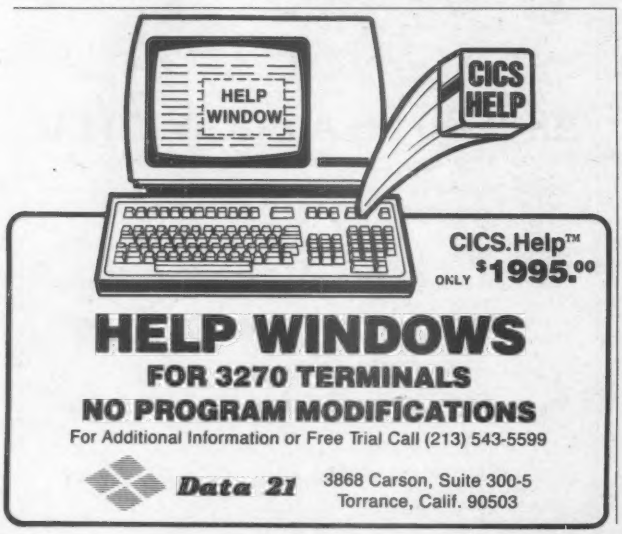
Provisions of agreement

The accord includes provisions for installation of glare reduction devices, adjustable chairs, detachable keyboards and regular machine maintenance.

The contract provides for extra work breaks away from VDTs, and it also gives female workers the right to ask for transfers to non-VDT work during pregnancy.

Gilbert M. Reich, an Equitable vice-president, said the company "is pleased that the terms of the agreement fall within the framework of our long-term business plans."

Workers and unions have long been seeking protections related to health and safety issues involving VDT use. Various scientific studies have provided inconclusive and sometimes contradictory evidence about the hazards posed by VDTs.



Special Report to feature nets

Are you lost in a forest of local-area or long-haul networks? Let *Computerworld*'s February Special Report on communications networks update you on network architectures, communications software, independent software and satellite communications.

The Special Report will focus on corporate networking choices, including the feasibility of satellite bypass and private-line networks.

Contributions to the Special Report should take one of two forms: tutorial articles discussing issues or trends or application stories outlining a particular user firm's experience with networks.

Articles may range from four to six typed, double-spaced pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached. The submission deadline for the February Special Report is Dec. 28.

If you have a story you would like to tell, or if you have any questions to ask, send them to Janet Fiderio, Special Reports Editor, *Computerworld*, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Threats to systems outpacing security technology

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — While they give security products vendors an "A" for effort, most visitors to last week's 11th Annual Computer Security Conference here said they don't think security technology is keeping pace with the threats to computer systems.

In a random survey conducted on the exhibition floor attendees told *Computerworld* that they were encouraged by the awakening of interest and the growing level of research and development demonstrated by vendors. Security personnel interviewed expressed considerable interest in the increasingly sophisticated access-control and data encryption devices and microcomputer security products only now becoming available.

But those same executives lamented the lack of a comprehensive approach to security — one product or vendor that handles all aspects of a company's security requirements — and the narrowly focused, task-specific nature of many of the products demonstrated here.

"It is very clear that the technology is not keeping pace. We haven't even quantified the threats yet. The risk possibilities have not been explored fully," David Moore said. Moore is second vice-president of Jefferson-Pilot Information Services, Inc., located in Greensboro, N.C.

Risks in data communications

According to Moore, the real security issues do not involve in-house, hard-wired systems, but the increasing risks involved in data communications. "Outside communications concerns me," he said. "We have a responsibility to our customers to protect their information. Some of the products here are years ahead of any need we might have, but none solves all our problems."

Alfred Foster, data security administrator with Englewood, Colo.-based U.S. West, also applauded vendor efforts. "They are making a very good attempt to meet our needs. The increase in R&D in security in the past year is phenomenal. Suddenly, everyone is interested in security it seems."

Foster said the greatest worry he faces with U.S. West, one of the holding companies created by the breakup of the Bell system, is authorized users remotely accessing corporate information. "Once that data is outside the mainframe," he said, "you have lost all control over it. There is really nothing you can do except try to maintain accurate audit trails. As far as I know, there are no products available today that address that concern."

With between 400 and 500 mainframe terminals under his security control, John Schneider complained about the limited scope of the security products available. "The kind of security I am looking for transcends the equipment I have seen here," said Schneider, who is security control administrator for ITT Communication and Information Services, Inc. in Secaucus, N.J. "Some of these systems require you to have one access control box per terminal. I do not need something like that. I want one box that can handle all our terminals. Otherwise, it just is not cost-effective."

Philip Snitkey, assistant vice-president of the Cedar Rapids, Iowa-based Banks of Iowa Computer Services, said he would like to see advances in text encryption technology.

"The variety of products today is incredible compared [with] just a couple of years ago," he said. "I am responsible for security within my organization. We have physical security devices and access controls in place, but we need more in the way of encryption. The way that communications is growing, including the use of satellites, that is vital."

Though he believes the technology is just now starting to catch up with the threats to computer systems, Michael McNamee said that something more than products is needed to ensure the integrity of information. "Users must be made aware of the threats to security," he said. "The information they are using and distributing is valuable, and they just do not realize the importance of integrity."

"I would like to see better education on security in our colleges," said McNamee, who is information asset security administrator with IBM in Westchester, N.Y. "I would like to see a curriculum for data security professionals. My background is in finance, and I only got into this field in my role as an auditor."

But in the end, according to Robyn Strang, the race between technology and threats may prove to be a vicious cycle. Strang is security officer with Menlo Park, Calif.-based Saga Corp. "I think we are making some advances, but someone will always counter them. Some of the products seem incredibly advanced, but it is only a matter of time before someone catches up to them. No matter what controls you develop, someone will always find a vulnerability."

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Safeguarding security plan integral to overall strategy

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — There are many different kinds of security. There is the security of being surrounded by loving family and friends. There is the security that comes from knowing you have enough life insurance. There is also data and computer systems security.

And then there is the security of security.

Redundant? Donn Parker doesn't think so. Important? Probably more than you can imagine, according to Parker.

Parker is a senior management systems consultant with Menlo Park, Calif.-based SRI International, Inc. and an expert in computer systems security. The author of three books on computer crime, Parker is also currently directing a computer abuse research project funded by the National Science Foundation.

Last week, at the 11th Annual Computer Security Conference here, he related to attendees the vital importance of protecting and safeguarding information about their security systems and practices. "An organization's security information about controls, practices, vulnerabilities and plans is the most sensitive of all," Parker said, "because it is the key to unlocking all other information. Secure security practices are needed. I may sound a bit paranoid, but you would do well to listen."

According to Parker, the security of security is plagued by two major classes of problems. The so-called active problems involve the voluntary, though perhaps not intentional, disclosure of secrets. The active problems include casual meetings and conversations in which a security administrator may unwittingly reveal his firm's security secrets — what Parker labeled a "loose lips sink ships" situation.

In addition, third-party questionnaires and inquiries as well as vendor and outsider visits pose the potential for active disclosure. And, while they are touted as one approach to designing company-wide security systems, in-house task forces often present another threat of overly wide security data dissemination. Parker also listed among the active problems in-house publications, training programs and overly informative terminal prompts to users who have not even logged on.

"I am amazed at the amount of information you will tell a total stranger at a conference like this," Parker said. "You will willingly reveal your security mechanisms, your safeguards — even your weaknesses. You are giving away the keys to the kingdom."

The second class of problems is what Parker labeled passive ones, involving involuntary disclosure of systems and practices. Among these are theft of security information, industrial espionage, the loss of such data and "spoofing," in which an unauthorized person poses as a legitimate insider to gain knowledge.

Parker outlined a number of steps an organization can take to offset both the active and passive threats to the security of security.

- First, a company must establish strict security policies and provide notice of them to every employee.
- A company must also promulgate a code of security conduct that establishes rewards for compliance and penalties for violations, such as disclosing a password.
- Firms should obtain confidentiality agreements with all vendors and consultants and provide for safe practices for the hiring and firing of all personnel, especially security employees.
- Parker urged corporations to avoid detailed disclosures of security data and to minimize screen prompts to prospective system users.
- Finally, he warned security personnel to keep losses secret.

Parker urged the careful control and discarding of security documents and the undertaking of an in-depth inventory of such information. In addition, he warned security administrators and all other executives to travel safely, carefully securing company information in their personal possession.

"Assume the enemy knows what you are doing, but keep everything as secret as possible. Employ the military's need-to-know concept for all security information. With everything you say, consider that your listener may be your worst enemy. The job you save may be your own," Parker said.

FBI head urges preventive action to protect sensitive data

By John Gallant
CW Staff

ROSEMONT, Ill. — In rapidly evolving industries such as the computer field, both law enforcement agencies and the private sector must work to keep abreast of potential problems, or the "twisted mind" will get ahead, the director of the Federal Bureau of Investigation said last week.

Speaking at the 11th Annual Computer Security Conference here, Judge William H. Webster assessed the "big three" problems — technology transfer, industrial espionage and computer-related crime — that he said threaten both corporate and national security today. Webster also outlined the steps the FBI has taken internally to beef up the security of its own computer systems.

Webster said the responsibility for countering the transfer of vital military and industrial technology rests squarely with his agency, assisted by the departments of State and Commerce and the U.S. Customs Service. He said that since the 1930s the Soviet Union has spent vast sums of money and manpower in an attempt to acquire such technology.

Webster said that in the past year there has been a spate of cases involving classified documents and other data being turned over to foreign intelligence officers and agents. Those cases have involved all types of people, Webster said, even an FBI agent arrested for allegedly supplying secrets to two Soviet agents.

"Our goal in foreign counterintelligence work is to identify and neutralize foreign intelligence operations, not just to arrest and prosecute the individuals involved," Webster said.

After touching only briefly on industrial espionage, Webster said that the investigation of computer-related crime has become an important facet of the agency's white-collar crime program.

He said that the FBI has begun to track crimes that fit the agency's definition of computer-related crime. He estimated the average dollar loss as around $500,000 per incident. Webster said it does not require genius to perpetrate a computer crime, only know-how.

"Since the investigation of computer-related crime is relatively new," Webster said, "we have had to develop new training methods. Since 1976 we have trained more than 300 agents and other law enforcement officials through our Computer-Related Crime school. It provides the basic skills needed to unravel the tangled trail of computer crime."

Webster said the agency had improved its own internal computer security by eliminating dependence on leased communications lines through the use of only dedicated lines, relying on transmission of only encrypted data, using access control devices and security software, employing the technique of periodic password changes and following strict policies for the acquisition and training of employees.

Webster characterized the federal computer crime legislation passed this year [CW, Oct. 15] as a beginning and said it would bring a measure of consistency to the state legislation in place or under consideration.

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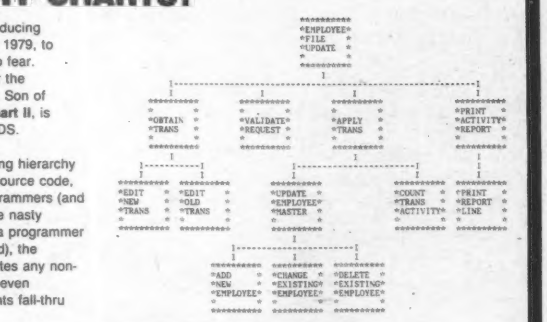

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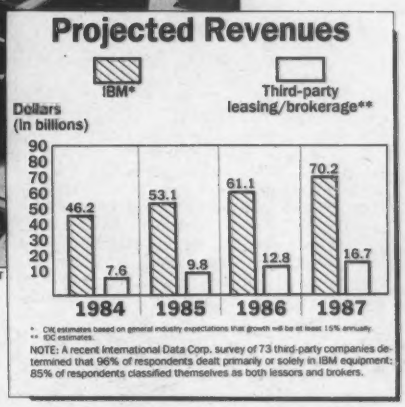
Computer leasing expands, lessors optimistic

Financing, mart niches viewed as key factors in current leasing boom

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

CW CHART



Coming out of the national recession two years ago, the computer leasing industry was troubled with uncertainty over the impact of IBM's leap into the third-party computer financing industry. Today business is booming, seemingly for everybody, and the industry is attracting new players; but nobody in the business is breathing any easier.

"There has always been a pall over the third-party leasing business, especially in the computer area," said Kenneth Pontikes, chairman of Comdisco, Inc., in an interview earlier this year. The industry, according to Jon J. Prager, chairman of Finalco Group, Inc. "has been through its ups and downs."

The industry right now is undoubtedly going through an up cycle. Market research firm International Data Corp. of Framingham, Mass., recently projected that the computer-related leasing industry as a whole will grow to revenues of $7.6 billion this year, a 30% increase over 1983 — about double the growth rate of the computer industry in general — and will grow 30% each year through 1987. IDC's figures include the market for used computer equipment, an area intertwined with leasing.

During the October meeting of the Computer Dealers and Lessors Association (CDLA), which numbers more than 200 companies as members, outgoing CDLA President Richard A. Forsythe, head of Chicago-based Forsythe/McArthur Associates, Inc., noted that "40% of the attendees [at the meeting] were not members two years ago. There is a lot of growth in this area."

In a recent IDC survey of 73 third-party leasing companies, 91% of the respondents rated business this year as good or excellent, and 94% said next year will be good or excellent. Despite that optimism, 62% of the respondents said they need to be more creative in order to stay competitive, and 41% said they need to diversify.

One does not have to look far to understand why today's optimism is tinged with caution about the future. IBM Credit Corp., the leasing subsidiary of IBM, has mushroomed into one of the largest companies in the business; IDC pegs IBM Credit as the leader in the field, putting $100 million of equipment out on lease each month through the first half of the year; others still give that distinction to Comdisco, with IBM Credit coming on strong in second place.

Formed in mid-1981, IBM Credit is now in high gear, estimated by IDC to be increasing its lease values by 92% this year and 50% next year.

The impact of IBM Credit on the third-party industry is a subject of debate within the industry. Some, like Comdisco's Pontikes, assert that IBM has legitimized an industry that has suffered from more than its fair share of scandals and IBM has thereby increased the size of the potential market; others, like Finalco's Prager, say IBM Credit has substantially limited growth opportunities in the IBM CPU and peripherals market (see story page 22). Even less clear is the impact that IBM Credit will have on the used computer market. The used market and the leasing market are inextricably tied together and, at some point, the equipment IBM Credit has put out on lease will begin to enter the used equipment market (see story page 23). Although there are many used equipment dealers not involved in leases, companies involved in leases are always involved in used equipment.

IBM is not the only computer manufacturer with a captive credit corporation; most of the large vendors have such subsidiaries or allied ventures formed with existing financing companies. The latest to jump into the fray is AT&T Credit Corp., which hopes to do for telecommunications equipment what the third-party market did for computer equipment. According to Charles Greco, director of financial services at IDC, "AT&T is trying to do in one year what it took IBM 20 years to do."

The leasing of telecommunications equipment, spurred by the deregulation of AT&T's equipment resources, is seen by many in the leasing industry as a potentially explosive new market. Edward Cherney, president of CMI Corp., is working with AT&T to develop distribution channels for used AT&T equipment, and he said that the key to success in that area lies in AT&T's commitment to make used telecommunications equipment a commodity in the same manner that IBM equipment has evolved. Cherney said AT&T has made that commitment through a willingness to provide maintenance of used equipment. AT&T Credit, while focusing initially on telecommunications gear, has made it clear it also intends to function in the computer market.

Finalco's Prager noted that "competition has been a way of life for us," and he expects to see IBM's and AT&T's credit subsidiaries, along with

See EXPANDS page 18

Companies search for tax breaks; complex leases result

By Peter Bartolik
CW Staff

"Basically, the lessor is a middleman. Like a real estate broker, he brings two parties together, and from making that marriage happen he takes a percentage."

That observation by Charles Greco, a specialist on leasing for International Data Corp. of Framingham, Mass., boils down the computer leasing company to its simplest form. But while the concept and basic forms of leases are relatively simplistic, the endless versions and the goals around which they are structured provide much fodder for lawyers and financiers.

At the most basic level, leases follow one of the following outlines:

- Structured to transfer ownership to the user at the expiration of the lease;
- Structured on the basis that the equipment will be resold on the used computer market at the expiration of the lease;
- Structured around various tax benefits that can be divided a number of ways between the leasing company and outside investors.

From the user perspective, the relationship in the first two examples is relatively simple. The user obtains needed equipment for a specified period of time but is not required to tie up a great deal of assets in any one year as with a direct purchase.

To move from the simplistic to the actual is what adds complexity to leasing. The lease can be structured in a variety of ways to benefit either the user — the lessee or the leasing company — the lessor, or both.

Options provided to the user include the length of the lease and purchase or renewal options upon expiration of the lease and can include provisions for flexibility such as early termination.

The user generally obtains equipment at a substantial discount from the purchase price based upon subtracting from the amount of total user payments the expected resale value of equipment after the lease expires; the user is also able to spread out payments for that equipment over a number of years. In turn, however, the user forsakes the resale rights to the equipment — unless a purchase is made during or at the expiration of the lease — and various investment and depreciation tax credits.

Because leasing companies can make more money by turning over

See LESSOR page 22

IBM Credit Corp. ascends to top of leasing firm arena

By Peter Bartolik
CW Staff

INDUSTRY SPOTLIGHT

In recent years IBM has taken aggressive steps to eliminate rental and leasing of its equipment. Realizing that many customers still do not want to purchase equipment, however, IBM established a subsidiary to provide that rental option while still recording the equipment on its own books as an outright sale.

From its start three years ago as a five-man operation, IBM Credit Corp. has grown to replace Comdisco, Inc. as the premier leasing company in terms of volume, according to Charles Greco, manager of financial services with market research firm International Data Corp. (IDC) of Framingham, Mass.

IDC estimates that IBM Credit was writing leases in the first half of this year at the rate of $100 million worth each month, and because the second half of the year is traditionally busiest, IBM is estimated to achieve $1.7 billion by the end of the year. "IBM Credit Corp. will win any deal it wants to win," Greco declared.

James Benton, executive director of the Computer Dealers and Lessors Association (CDLA), an industry group composed of more than 220 third-party companies, conceded that IBM Credit Corp. will likely displace Comdisco as the No. 1 lessor by the end of the year, but argued that IBM does not want all of the third-party business. Third-party companies collectively have historically been IBM's biggest customer.

"The reason for IBM Credit's existence is that IBM wanted to get out of the leasing business and needed cash flow. But IBM was not going to give all of that business to the third-party companies," Benton said. With some 2,000 salesmen employed by CDLA members primarily in the business of leasing IBM equipment, he added, "We're an integral part of [IBM's] marketing strategy."

Kenneth N. Pontikes, chairman, president and founder of Comdisco, went as far as to question IBM Credit's viability in the area of financing leases. "If you look at IBM Credit in competition with the third-party industry, can they make the kinds of returns in that business that the rest of their businesses have the opportunity of making? No, they can't," he declared, predicting that IBM Credit will shift away from the financing of leases.

Pontikes and Benton both argued that the third-party industry is growing at twice the annual rate of growth of DP equipment sales; the third-party market is expected to grow as much as 34% this year to between $7 billion and $8 billion. "It's almost as if there is a realization that these [third-party] services are required as well as the additional hardware and the financing. I think that bodes very well for the industry as a whole," Pontikes said.

Jon J. Prager, chairman and chief executive officer of Finalco Group, Inc., readily conceded that the impact of IBM Credit's growth has "substantially limited growth for companies like Finalco over the next couple of years."

But Prager noted that competition has always been fierce in the leasing area and his company has prevailed "while big institutions have come and gone."

Greco believes IBM's subsidiary will attempt to duplicate the growth patterns of the other segments of its parent's business, and he argued that third-party companies must become more flexible in structuring their leases and will have to diversify into other areas such as communications equipment and software leasing.

Indeed, the larger companies appear to be making efforts to enter other market areas. Comdisco is marketing a disaster recovery service and has established a risk arbitrage subsidiary, among others; Finalco, which used to lease only DP equipment, in fiscal year 1984 wrote 53% of its leasing volume in non-DP equipment, including aircraft, telecommunications equipment, computer-aided design and manufacturing equipment and other types.

The leasing companies are also shying away from a dependence on leasing CPUs, a reliance that caused the collapse of Itel Corp., and are instead devoting more resources to peripheral equipment, which has a longer life span and greater residual values. Finalco, for instance, reported that in the fiscal year ended in July, mainframe leases represented only 5% of its total leasing volume.

EXPANDS from page 17

those of other vendors and financial institutions, competing in many areas with the independent companies.

The growth in the leasing industry is so great and expected to continue over a long term, that one of the greatest concerns facing the industry, according to Forsythe, is "how to finance that growth." He said the industry could grow to $20 billion by 1990, based on current projections, and outside financing is a key to growth of third-party companies that cannot afford to tie up their assets in leases.

The fastest growing source of outside financing has also been the most controversial. There are many types of leases and many labels, but one type that has generated great profits and great problems is that known as tax-advantaged. A simplified explanation of this lease is that the leasing company, in exchange for various tax benefits and a portion of resale values, obtains the financing for equipment from outside investors, and the leasing company administers the lease for those investors.

A key to this type of lease is the tax shelter it provides to the investors, who see practically no profits from the actual lease until after the lease expires and the equipment is resold. It serves to provide users with relatively low-cost equipment; leasing companies can avoid tying up their own cash in leases; and investors gain short-term tax write-offs and long-term profits. Everybody is happy except for the IRS, which is currently on a crusade to halt all tax shelters that it deems are created merely for the purpose of sheltering income.

James F. Benton, executive director of the CDLA, concedes that the IRS does not appear to be singling out the computer leasing industry, but in fact is going after many industries involved in shelters. Nevertheless, he added, the scrutiny of what he calls "essentially plain vanilla wrap leases," along with a negative business journal article last year critiquing Comdisco's financial practices, has served to deter a number of leasing companies from going public.

According to IDC's Greco, the key for the future of the third-party industry, buffeted on one side by IBM and on the other by ever-changing tax laws, lies in its ability to remain flexible and to diversify. "Third-party companies have to continue to look for creativity; they must become more flexible in structuring their leases in order to compete with IBM Credit," he said. The independent companies must also quickly move into new areas where IBM and others have yet to focus, he added.

For smaller companies, the key to long-term growth may not be new markets, but rather identifying existing markets niches that are overlooked or neglected by IBM Credit and the bigger independent firms.

According to Robert Miller, chief executive officer of Minneapolis-based Centron DPL, "nichemanship" is the key to success. Relatively small, with revenues last year of $15.6 million, Centron DPL has focused primarily on leasing IBM front-end controllers, products that have a long product life compared to CPUs.

Robert Irish, vice-president of technical sales with Centron DPL, put the company's relationship with IBM in perspective: "Sometimes you're the good guy and sometimes you're the bad guy; and sometimes you're tolerated."

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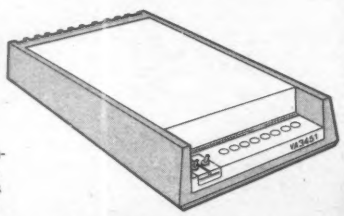

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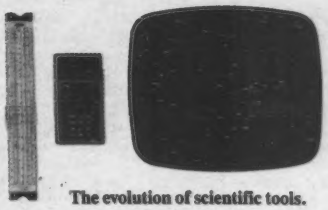

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Second-hand computers make more for lessors

By Peter Bartolik
CW Staff

Not all used computer dealers deal with leases, but all computer lessors deal in some manner with used computers.

The leasing of new equipment and used equipment is inextricably tied to the selling of used equipment. That is so because leases are structured around the expected resale or residual value of equipment when those leases expire.

In all leases other than those structured outright to provide ownership of equipment to a lessee upon termination of the lease, the residual value is probably the key component.

When a leasing company provides a user with a piece of equipment for a three-year period for lease payments that will add up to, say, 60% of the purchase price paid by the leasing company, it does so based on the assumption that it will be able to recover the balance plus a profit from the sale of the used equipment after the lease has terminated.

According to the manager of financial services for Framingham, Mass.-based International Data Corp., Charles Greco, who is involved in determining residual values of IBM equipment, the golden rule in determining those values is: "Be accurate or be conservative." According to Greco, when a leasing company writes a lease based on residual values, accuracy will ensure a profit, conservatism will bring greater profit and inaccuracy on the side of overestimating residual values leads to disaster. The most famous case in point, according to Greco, was the bankruptcy of Itel Corp., which saw its overvalued inventory of IBM 370 mainframes devalued overnight with the introduction of the IBM 4300 line.

IDC said it bases its determination of residual values on a model developed through the analysis of historic information. IDC has identified four major life cycle phases through which all computer equipment passes, albeit at various rates of speed:

■ The active marketing life starting from first delivery of prod-

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INDUSTRY SPOTLIGHT

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ever greater amounts of equipment, they, like the users, do not want to tie up their assets in equipment inventory. In essence, the lessor, with purchased equipment on his hands, looks around for somebody else to buy the equipment, providing the lessor with additional cash to make more deals.

Historically, the traditional vehicle for the lessor has been the nonrecourse or leveraged lease. In this scenario, the lessor, after arranging a lease, puts up 20% or more of the purchase price and obtains the balance from a financial institution in exchange for assigning lease payments to that institution. The lessor makes a commission from assignment of the lease and retains the tax benefits of ownership. The financial institution provides the money based on the collateral value of the equipment and in the event of nonpayment can repossess the equipment, but it has no recourse to seek repayment from the leasing companies.

The newest wrinkle to leasing, and the most profitable and controversial, is the tax-advantage lease, or wrap lease. In this scenario, the lessor merely arranges a lease for a user; the equipment is then sold for a small portion of its actual value to one or more third-party investors who actually lease the equipment back to the user and arrange for the leasing company to administer the lease. Lease payments generally are assigned by the investors to the leasing company for the first few years of the lease. The investors gain tax shelters in that their investments are generating little or no return in those first few years, and various tax credits can be divided a number of ways.

While extremely profitable for leasing companies, the tax-advantaged lease is under constant scrutiny from the Internal Revenue Service, which terms as abusive — and therefore nondeductible — any shelter that provides an investor with no benefit other than the sheltering of income. Both Comdisco, Inc. and Finalco Group, Inc. suffered financial setbacks when it was revealed that the IRS was investigating their use of such lease instruments; investors were scared off by the possibility that the IRS would turn around and disallow the tax deductions at the heart of the lease. Both were effectively given clean bills of health when those investigations were terminated.

However, according to Jon Prager, chairman and chief executive officer of Finalco, the IRS, both before and since the investigation, has assigned an agent to monitor the company's tax-advantage activities. Prager said such scrutiny "is a way of life."

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IBM Credit in the resale arena: Estimating its impact

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

The biggest question facing participants in the third-party market — including lessors and also dealers of used equipment — is the impact that IBM Credit Corp. will have on the resale market.

IBM Credit is writing leases at a phenomenal rate for a three-year-old company. Beginning with a trickle this year, and exploding in following years, IBM Credit leases will begin to expire, and the equipment currently out on lease will become available for resale and on a lesser scale for re-lease.

The Computer Dealers and Lessors Association (CDLA), a trade association representing more than 200 companies in the industry, recently pondered the question of dealing with IBM Credit in the used market. At its fall meeting in New York last month, the CDLA voted in principle to allow IBM Credit to tap into the CDLA's electronic trading network.

A minority of attendees at the CDLA meeting were in favor of banning IBM Credit participation in the network, arguing, according to those present at the closed meeting, that IBM Credit would contribute little equipment for resale by CDLA members and would instead use the access to gain strategic information about its competitors.

The majority view, however, was expressed by Edward Cherney, president of CMI Corp. of Minnesota, who said, "Either we play ball with [IBM Credit] or they will go and play in their own ballfield." Thomas Martin of New Jersey-based Computer Financial, Inc., added that third-party companies have the choice of working with IBM Credit or watching Big Blue's subsidiary develop an alternate distribution channel for used equipment that will freeze out the independent companies.

Charles Greco, a leasing specialist with Framingham, Mass.-based International Data Corp., takes the view that "IBM Credit is in for a big surprise" when it attempts to remarket used equipment. Greco said IBM Credit will be competing in the used market with established firms, such as Comdisco, Inc., that have been successful for 15 to 20 years and that have established distribution channels. "IBM has never marketed used equipment for anything less than list price to users who didn't know any better," Greco said.

But, Greco acknowledged, should IBM Credit attain success in keeping with its dominant parent, "used prices will collapse." If IBM Credit is able to flood the market with used equipment, supply will drive down prices, and residual values will prove to have been inflated for third-party companies and IBM Credit itself.

Even if IBM Credit were to establish ties with the Comdiscos of the third-party market, Greco said, those independent companies will still push their own equipment first, based on fiduciary responsibility to their own third-party investors and on plain business sense.

RESIDUAL from page 22

uct and ending just prior to announcement of a replacement model.

■ Critical replacement period when shipments are at a peak just prior to replacement model announcement and when residuals may experience the first sharp decline.

■ Late life, when shipments of the replacement model are declining and a new model is expected.

■ Residual life, the final stage when the system has twice been superceded and residuals are low.

Key factors affecting residual values during those cycles, IDC said, are availability of replacement systems, IBM price actions and policies, major price actions that may be paving the way for new product announcements and processor capabilities.

In the past, Greco asserted, appraisers of computer equipment residuals were often way off in their estimates, with equipment devaluing at a more rapid rate than anticipated. The problems have generally been with determining residual values of CPU equipment, which have suffered from rapid introductions of replacement products, he said. On the other hand, Greco said, most appraisers generally have underestimated the residual value of peripheral equipment, which generally has a long life span.

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Preventive measures essential to data security

CW AT DATA TRAINING

By Maura McEnaney
CW Staff

PHILADELPHIA — Sensitizing employees to the importance of data security is essential to preventing computer crime, data education personnel were told recently.

August Bequai, a Washington, D.C.-based attorney specializing in white-collar crime, told attendees of Warren/Weingarten Publications' Data Training Conference & Exposition at the Adam's Mark Hotel here recently that unless companies educate employees about the importance of security, they may be a likely target for abuse.

"You've got to sensitize your people to the fact that you do have a [security] problem," he said. "Teach them the value of security."

Companies should establish a computer security program that suits their needs, but, the attorney warned, "Don't go overboard — [the computer] is not a safe."

Computer crime is in its "formative years" Bequai said. However, there are several steps that managers can take and signals they can look for to help ward off computer crime, the attorney said. Among them, companies should take note of employee unrest in order to tighten up DP security. Employees unhappy about a particular company could turn to the computer for revenge, the lawyer said.

Companies should also make sure that DP equipment is properly controlled and that only authorized persons have access to the system. Firms cognizant of employee alcohol, gambling or drug problems should also be particularly careful of their computer systems, especially if abuse of the system could result in a funds transfer.

But even with this type of protection, "I bet there isn't a company here today that isn't a victim of white-collar crime," he said, adding that many of those companies have probably not detected those crimes.

Many of the companies that have been victimized by computer crime are often hesitant to bring the case to prosecution for fear of possible ridicule, higher insurance rates or alienating creditors, Bequai said.

In addition, law enforcement officials are hesitant to take on cases of computer and white-collar crime.

For law enforcement officials, the cost of following up on a white-collar crime case is almost prohibitive. "The [district attorney's] office has a $2 million budget and to prosecute a white-collar crime; you can easily expend about a half a million dollars," he said. There are also no federal and only a handful of state statutes that deal with computer crime.

One of the problems associated with computer crime is that "it is difficult to distinguish crime from non-crime," especially in the case of hackers.

SCIENCE/SCOPE

Radar and sonar video signals can now be displayed without fading, thanks to a newly developed video image processor. The device converts analog images into digital format so those images can be stored and displayed continuously on a standard television monitor. In addition, images can be shown on remote monitors and be recorded on videotape. The Hughes Aircraft Company processor, using digital storage, offers greater versatility and a wider range of information than analog circuitry. Digital storage allows considerably more flexibility in retaining and updating tight images than previously available using analog circuitry. The processed digital image resembles a conventional TV picture and can be seen in ambient light, eliminating the need for a darkened room.

Weather satellites help airlines save $700 million in fuel bills, thanks to timely pictures and other data. Meteorologists who plan trips for airlines use satellite information to find efficient travel routes. For example, normally the route between Los Angeles and Hawaii is about 2,300 miles. In case of a headwind, the airline will select an alternate route. Even though the new route may be 2,500 miles long, better flying conditions could save the airline $1,500 in fuel. The latest three spacecraft in the Geostationary Operational Environmental Satellite (GOES) system were built by Hughes. The sensing devices, which provide the daytime and nighttime pictures shown on TV and printed in newspapers, were built by a Hughes subsidiary, the Santa Barbara Research Center.

Thermoelectric cooling has made a hand-held infrared viewer more convenient and more economical. The Hughes Probeye™ infrared viewer, originally equipped with argon gas cooling, now comes in an all-electric model. The new version weighs 1.2 pounds less and makes sustained use easier and less tiring. The Probeye viewer sees heat the way a camera sees light, converting it instantly into an image seen through an eyepiece. The viewer is used to spot heat maintenance problems and energy losses in industrial and commercial applications.

The first attempt to sample the atmosphere of an outer planet, NASA's Project Galileo will journey 750 million miles to Jupiter this decade. The mission will consist of two spacecraft, an orbiter and a Hughes-built probe. Six instruments inside the probe's descent module will assess the structure and composition of the atmosphere, determine the location and structure of clouds, calibrate a precise ratio of hydrogen and helium, and measure lightning, radio emission, and energy absorption. The probe will transmit data to the orbiter for relay to Earth. Project Galileo will be the first interplanetary vehicle launched from the space shuttle. The launch is set for May 1986 and arrival for August 1988. Four Hughes-built probes explored the atmosphere of Venus in 1978.

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HUGHES

OAC '85 scheduled

ATLANTA — The 1985 Office Automation Conference (OAC '85) will be held Feb. 4-6 at the Georgia World Congress Center here.

Sponsored by the American Federation of Information Processing Societies, Inc. (Afips), OAC '85 will offer more than 45 sessions on topics such as organizational impacts, office workstations, ergonomics of the workplace, communications, technologies and issues and productivity.

The registration fee is $125 in advance, $150 on-site. The one-day registration fee is $50.

More information is available from Afips, 1899 Preston White Drive, Reston, Va. 22091.

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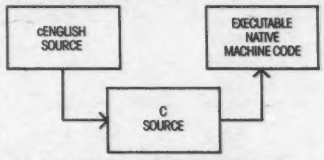

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SAMPLE cENGLISH PROGRAM

```
IDENTIFICATIONS
  MODULE:  Mininame
  AUTHOR:  bcs
  DATE:    8/29/84
  REMARKS: Sample cENGLISH program that adds first
           names to a file
END IDENTIFICATIONS

GLOBALS
  FIXED LENGTH 1 ans
  FIXED LENGTH 15 Fname
END GLOBALS

MAIN PROGRAM
  BEGIN
    CLEAR SCREEN
    SET ECHO OFF

    USE "NAMES"
    VIEW BY "ID_FNAME" ASCENDING

    AT 23,1 SAY "Add a record? Y or N"
    AT 23,25 ENTER ans USING "!"

    WHILE ans EQ "Y"
      CLEAR GETS
      AT 6,1 SAY "Enter first name"
      AT 6,20 GET Fname
      READ SCREEN

      INSERT
        Fname = Fname
      END INSERT

      AT 12,10 SAY "Welcome to cENGLISH," & Fname
      WAIT
      AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
      STORE "                    " TO Fname
      STORE "  " TO ans
      AT 23,1 SAY "Add another record? Y or N"
      AT 23,30 ENTER ans USING "!"
      CLEAR ROW 1 THRU 23

    END WHILE

    AT 12,10 SAY "That's all for now!"
    UNUSE "NAMES"
    SET ECHO ON

END PROGRAM
```

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C4Q84

Speaker gives tips on buying, installing local nets

CW AT FOAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Organizations looking to install a local-area network should steer clear of vendors likely to fall victim to the forthcoming shakeout and should recognize that network vendors generally provide no support after the sale, according to Connie Zuckerman, a senior consultant with Arthur Andersen & Co. here.

In a comprehensive presentation at the recent Federal Office Automation Conference here, Zuckerman provided attendees with tips on selecting and installing local-area networks based on her experience in OA projects.

She asserted that OA managers frequently underestimate the amount of time and effort required to implement a local-area network. A successful project, she said, will require a careful OA systems development methodology that includes planning, design, installation and systems management phases.

Zuckerman made the following suggestions for avoiding pitfalls in each stage:

- In the planning phase, create a steering committee with members from the data processing, communications, office automation and user staffs. Determine user requirements for applications software, security and outside data bases, as well as the technical requirements and size of the system.
- Do not let the technology — or the vendor's sales pitch — drive the decisions; make decisions based on user requirements.
- Evaluate the vendors, keeping in mind the coming shakeout.
- Design, install and test a prototype network, especially for large networks.
- Do not neglect systems administration once the network is installed. It is a time-consuming job that requires assigning responsibility for network planning and security; providing user-friendly documentation; establishing procedures, such as for back-up and recovery; and user training.

Another speaker, Walter H. Mackie of the U.S. Navy, agreed, saying the network vendors are motivated only to make more sales, not to provide user support.

Mackie, who is deputy director of the Navy Secretariat's office automation and communications system, described his efforts to develop a local-area network to serve the Navy and Marine Corps headquarters commands in the Washington, D.C., area. A multivendor pilot version of the network is expected to be implemented in fiscal years 1985 and 1986, he said.

Zuckerman CW Photo by M. Betts

In addition, Mackie said his office has developed a Document Interchange Format (DIF) standard to permit the exchange of text between systems supplied by different vendors.

He described the DIF as a "software filter programmed by each vendor to allow conversion to and from the agreed-upon standard."

Datapoint Corp., Wang Laboratories, Inc. and Xerox Corp. were recently validated as complying with the DIF, Mackie said.

ICCA lists firms on-line

ST. LOUIS — The Independent Computer Consultant's Association (ICCA) has put the national directory of its 1,500 member firms on-line with the Compuserv Corp. videotex service.

The action will permit Compuserv users to seek out ICCA consultants on the basis of the consultant's specialization, location, personal or company name or other criteria.

ICCA members are all full-time consultants, the association said, adding that 60% of the membership specializes in commercial consulting and 40% specializes in scientific consulting.

More information is available from ICCA through Box 27412, St. Louis, Mo. 63141.

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Electronic mail, EFT demand tighter security controls

CW AT FOAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Security experts told attendees at the recent Federal Office Automation Conference (Foac) here that the emergence of electronic mail, local-area networks and electronic funds transfer (EFT) have all heightened the need for hardware and software security controls.

"A lot of corporations would like to use electronic mail . . . but they're afraid to. They are concerned about who has access to it, so they are willing to use electronic mail for routine matters, but not for sensitive matters," observed Stephen T. Walker, president of Trusted Information Systems, Inc. of Glenwood, Md.

Walker, a former Department of Defense official, urged OA managers to establish classifications for the sensitivity of business information much as the military does, and then obtain computer operating systems that control each person's access to each category of data.

He pointed out that the Department of Defense Computer Security Center at the National Security Agency in Fort Meade, Md., has an evaluation and rating system for security software products [CW, Sept. 17].

These trusted computer systems should be part of an overall program that includes physical, procedural and personnel security, he stressed.

Another important security area is the encryption of data communications, Walker said, noting that the U.S. Department of the Treasury recently established a new policy to assure the integrity of the department's EFT data.

Walker

Treasury Secretary Donald T. Regan, in an Aug. 16 directive, said that by June 1988 all Treasury Department EFT transactions must be authenticated, conforming to the Ansi Standard X9.9 for Financial Institution Message Authentication and the National Bureau of Standards (NBS) Data Encryption Standard. Dennis Branstad, manager of computer integrity and security technology at the NBS, said that this requires the EFT message to be sealed so that any replacement, reordering, deletion or repetition of the message or characters can be detected.

Dennis Steinauer, a computer scientist at NBS, discussed the security implications of the proliferation of desktop personal computers, each one equipped with user-friendly features that make security difficult.

Steinauer emphasized that personal computers typically lack the built-in security features that mainframe computers have, such as multiple processor states, privileged instructions and memory protection. "Without such hardware features, it is virtually impossible to prevent users from accessing or modifying parts of the operating system. Therefore, users can circumvent any software controls," he said.

Steinauer said there are products on the market that can mitigate security concerns about personal computers. He noted that next year NBS will issue federal guidelines for the security of small computer systems, and it is working on standards for password usage, data integrity and local-area network security.

Choice of micro vs. workstation

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The office automation market has evolved to the point where personal computers and advanced workstations can both find niches in large organizations, according to speakers at the recent Federal Office Automation Conference here.

Deborah L. Fain, vice-president of Samna Corp., an Atlanta-based vendor of office software for microcomputers, stressed that a personal computer is a flexible, generic product, while a workstation is designed to be part of a total system aimed at a specific type of user.

Evaluating both forms of end-user computing, Fain said that the flexibility of the personal computer's open architecture makes it a more versatile tool than the workstation.

The personal computer's open architecture encourages the use of innovative software and peripherals. "The advanced workstation integrates all the hardware and software that the job function demands" in a closed architecture that does not easily accept enhancements, she said.

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INTERNATIONAL REPORT
CW International News Network

JAPAN

TOKYO — Japan's Big Six computer makers have reported glowing financial results for fiscal year 1984. Leading the pack was Mitsubishi Electric Corp., which showed a 53% growth in computer-related sales from the same period in 1983. All six companies increased office automation sales in Japan as well as computer sales abroad. Fujitsu Ltd. has grown 28%; NEC Corp. has increased 28%; sales at Hitachi, Ltd. are up 25%; Toshiba Corp. is up 25%; and Oki Electric Industry Co. showed an increase of 20%.

■

TOKYO — The recent Fifth-Generation Computer System International Conference here focused on the programming language Prolog, along with the development of a parallel processing machine, artificial intelligence and future international cooperation. Progress on Japan's own fifth-generation project at the Institute for New Generation Computer Technology (Icot) was discussed. The Icot AI machine is said to feature a conversation function and an inference function.

■

TOKYO — Fujitsu, Ltd. has introduced a net environment called Fujitsu Network Architecture 4 (FNA4) that is said to provide integrated information systems with the following five communications capabilities: wide-area networking, large-scale networking, access to corporate information net systems, local-area networking and standardization. FNA4 can support satellite communications, videotex communications, digital transmission services and facsimile services. The net is reportedly capable of supporting up to 10,000 terminals.

KOREA

ICHON — Hyundai Semiconductor and Western Design Center, Inc. (WDC) have entered a technology exchange agreement involving WDC's 8- and 16-bit Cmos versions of the 6502 microprocessor. Under the terms of the agreement, Hyundai will manufacture and market the WDC devices here and also in its new Santa Clara, Calif. facility.

THE NETHERLANDS

AMSTERDAM — The European market for professional micros will see a tenfold growth in a six-year period, according to a recent report from International Data Corp. here. The study also revealed that the relative market shares of 8- and 16-bit systems will be reversed by 1989. The Netherlands had an installed micro base totaling 18,500 in 1983 and an average annual growth rate of 54%, which will result in an installed base of 250,000 by 1989. It is estimated that the nearby Belgian market will grow annually by 47%.

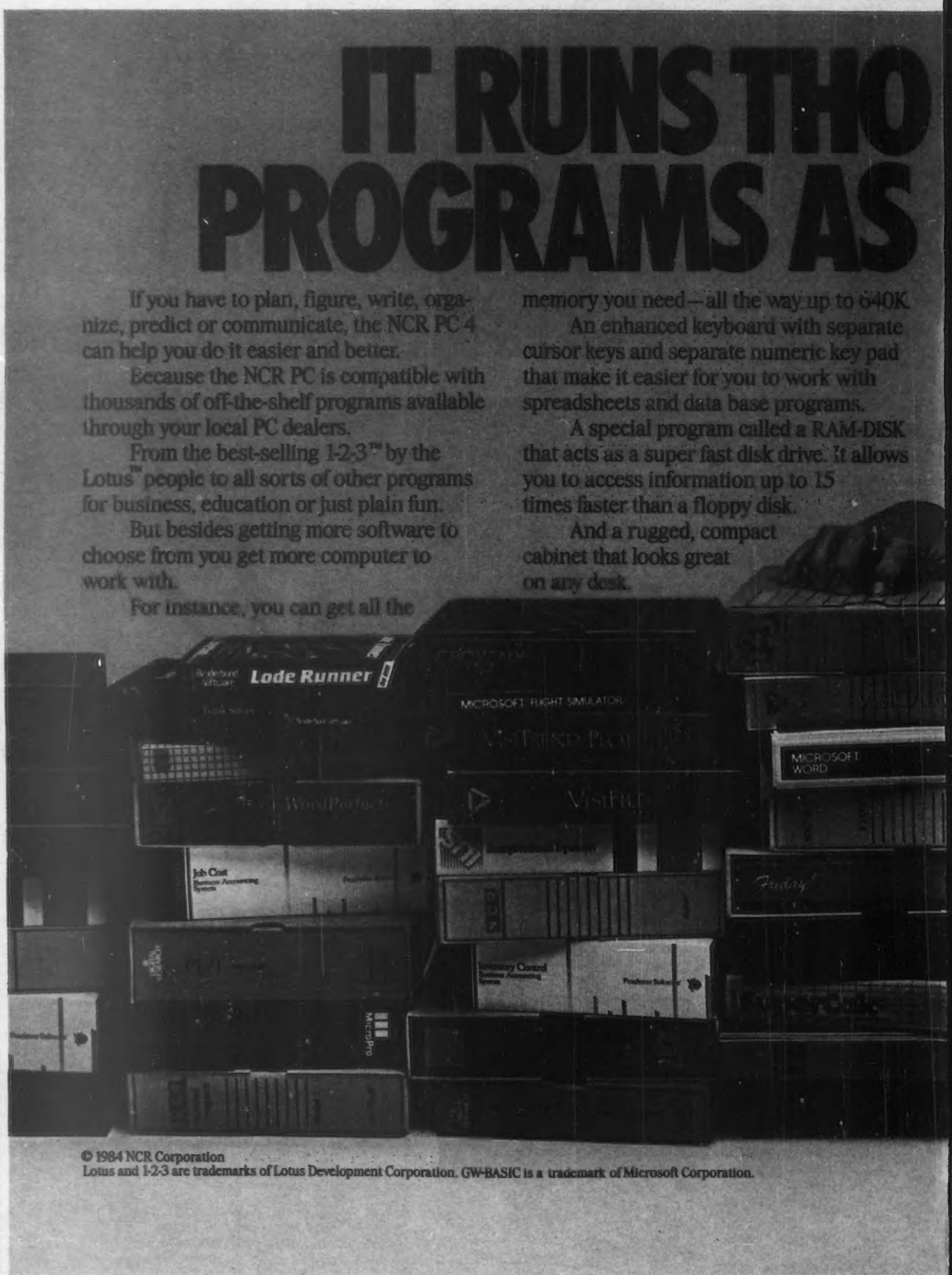
■

AMSTERDAM — The Dutch group Philips Information Systems, Inc. and the German group Siemens AG will cooperate in the joint research and development of high-density memory chips. The vendors' five-year project will focus on the production of 1M- and 4M-bit memory chips at facilities in Nijmegen, Netherlands, and in Hamburg, West Germany. Both companies are expected to invest roughly $150 million, with additional funding coming from the two countries' governments.

■

THE HAGUE — Deregulation of the Dutch telecommunications industry has become a hot topic here, sources said. An investigative committee contacted the research group McKinsey, Inc. to complete a future-status report before mid-1985. The Postal Telephone and Telegraph (PTT) agency will retain its monopoly on telecommunications, telex and data infrastructures, but will lose control of peripheral equipment.

Furthermore, the financial relationship between the PTT and the government will be loosened. The future structure of communications here will be built around three entities: a public entity, an entrepreneurial entity and the ruling entity modeled after Oftel in the UK.



NEWS

CALENDAR

WEEK OF NOV. 25

NOVEMBER 26-27, INDIANAPOLIS — **Expanding Lotus 1-2-3 Applications.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

NOVEMBER 26-28, CHICAGO — **Cellular Communications '84: The Industry Conference.** Contact: Online Conferences, Inc., Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

NOVEMBER 26-28, SAN FRANCISCO — **Computer Graphics for Business.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-28, PINE MOUNTAIN, GA. — **Data Communications: Bringing You Up To Date.** Contact: Institute for Communications and Information Management, P.O. Box 8, Pine Mountain, Ga. 31822.

NOVEMBER 26-28, WASHINGTON, D.C — **Integrating Microcomputers into Corporate Environments.** Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

NOVEMBER 26-28, TEANECK, N.J. — **Project Management Control.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 26-29, COLUMBIA, MD. — **Data Base Machines: In-Depth.** Contact: Continuing Education Institute, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

NOVEMBER 26-29, LOS ANGELES — **Data Communications: Components, Systems and Networks.** Contact: Institute for Advanced Technology, 65 W. 55th St., New York, N.Y. 10019.

NOVEMBER 26-29, COLUMBUS, OHIO — **DOS/VSE with Explore/XP.** Contact: Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 26-30, BOSTON — **Systems Analysis.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

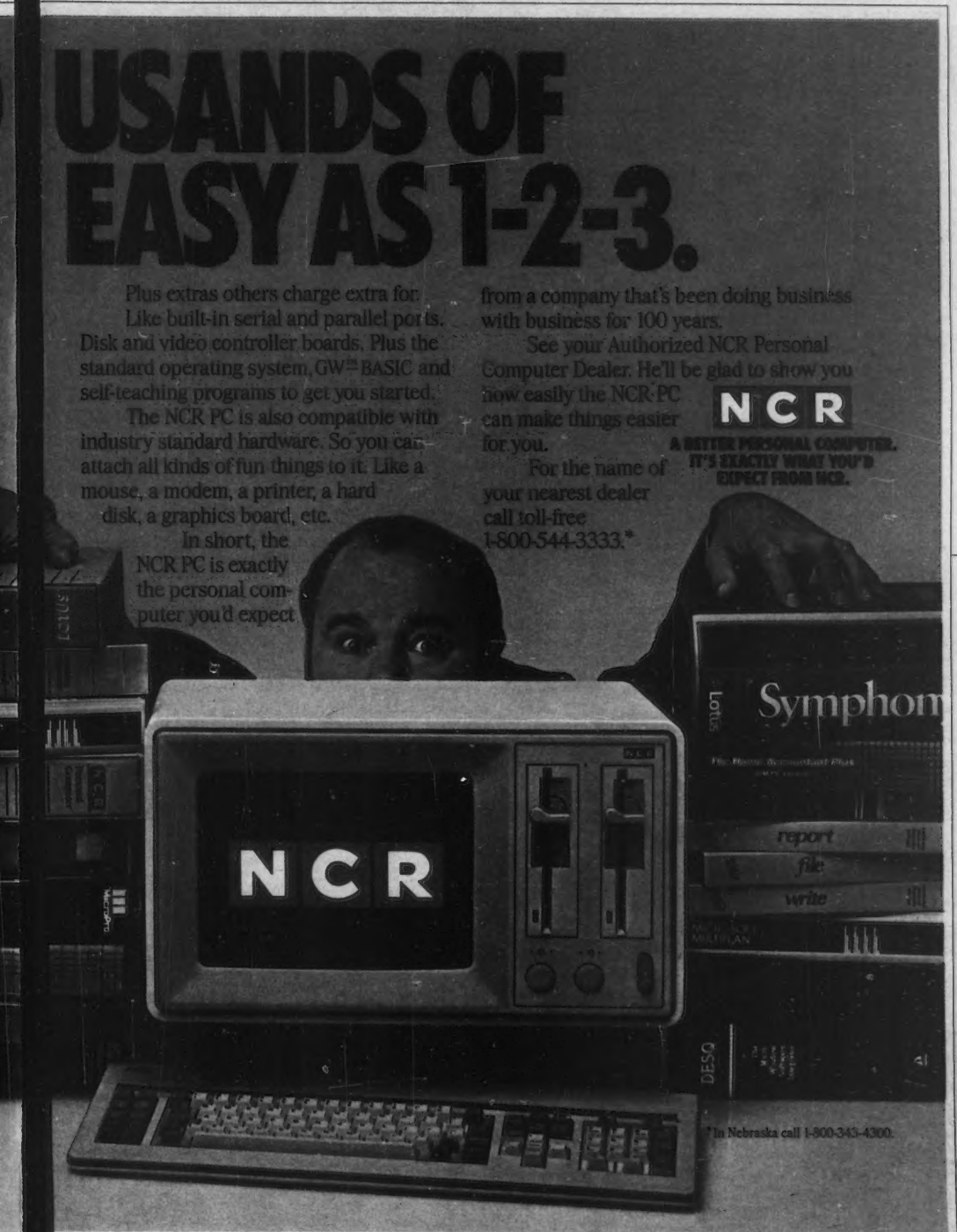
NOVEMBER 26-30, NEW YORK — **IMS Data Base Design.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

NOVEMBER 27-28, TAMPA, FLA. — **Realistic Applications of Personal Computers in Business.** Contact: Lucy Bell Burton, Peat, Marwick, Mitchell & Co., 810 Seventh Ave., New York, N.Y. 10019.

NOVEMBER 27-28, CHICAGO — **IBM vs. AT&T: Round One.** Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

NOVEMBER 27-29, FT. LAUDERDALE, FLA. — **Telephone Systems: Their Selection, Operation and Management.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

NOVEMBER 27-29, CAMBRIDGE, MASS. — **The 1984 Hammer Information Systems Conference.** Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.



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EDITORIAL

Comdex: pacing micro evolution

Perhaps the only part of the computer business that has evolved faster than the business itself over the past few years is the annual fall Computer Dealers Exposition, also known as Comdex. This harvest home of the microcomputer season started last Wednesday and ended just yesterday, and show sponsors were expecting some 100,000 attendees to converge on the miles of aisles lined with some 7,000 (yes, seven thousand) display booths.

Comdex has come to serve as a compass from which readings of the direction of the microcomputer business can be accurately taken. True to this form, the show's beginnings six years ago were marked by negligible interest on the part of serious business users, as the micro was more a toy of the hobbyist than anything else. Last week, the eyes of corporate DP management were focused on the networking achievements that vendors brought to Las Vegas, as managers continue to grapple with the increasingly complicated issues of integrating into mainframe environments the millions of micros now installed in major companies everywhere.

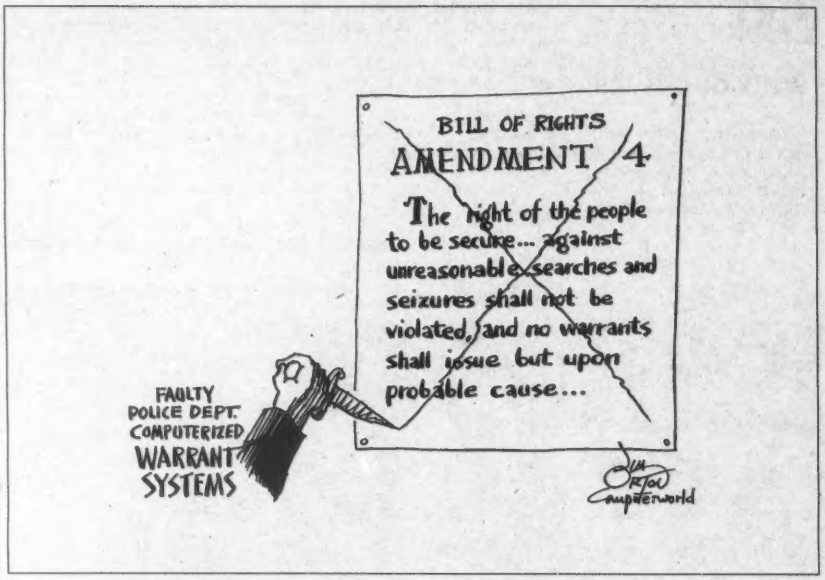
Comdex has also borne out the cyclical nature of the micro business, where a rash of hardware announcements one year has been followed by an onslaught of software operating system and application software debuts, which, in turn, are followed by the next generation of hardware. For example, in 1982, Comdex was predominantly a hardware extravaganza, where dozens of vendors dragged their IBM Personal Computer look-alikes out of the laboratories and onto the show floor.

In 1983, software to run on the Personal Computer and compatibles highlighted the show, while IBM and others were preparing the next round of more powerful 16- and 32-bit micros, with IBM continuing to pull the micro business in its wake. In fact, according to one report, there were approximately 10,000 IBM Personal Computers on the Comdex floor last year, demonstrating the pride of the software vendors.

In 1984, Comdex featured not only the much more sophisticated integrated packages supported by these high-powered machines, but also the communications software that micro managers are demanding. The hardware featured at the show was not computers, but elegant laser printers, which today can be had for under $5,000, compared with $30,000-plus just a couple years ago.

And now, of course, the traditional mainframe software and hardware vendors are the ones that stand out in the Comdex crowd, as the show has taken on more the appearance of the National Computer Conference than a dealers' confab. For those attending the show, this proves more a nightmare than a blessing.

Finally, it is worthy of mention that, despite an actively ongoing shakeout in the microcomputer business, more vendors (1,400) than ever were exhibiting at Comdex.



LETTER

Avoiding memory loss in 4381 upgrade

The article, "IBM DOS/VSE users lose memory in 4381 conversion" [CW, Oct. 29] failed to mention methods for resolution of the problem. Converting E mode VSE to 370 mode is the least desirable aspect of installing a 4381 computer (due to the memory loss) and is probably the most difficult approach.

The easiest solution is to install the VM/SP that will support the VSE E mode processing on the 4381. While additional cost and processing overhead is incurred, the simplicity of a straight hardware installation is possible, without major concern given to extensive operating system conversion and testing. In addition, for the users that are under severe virtual storage constraints, the VM/SP offers another avenue for memory expansion without converting to an operating system with extended addressing capability or waiting for the new VSE/SP release that supports the Extended Architecture.

I suspect, however, the whole idea of the article was not to warn future 4381 users of virtual storage loss as much as it was intended to take a shot at IBM and their marketing practices. I would be the last person to say that IBM support offers complete satisfaction, but for the user who knows how to ask the appropriate questions, timely guidance and advice can be obtained. The key to asking the right questions is full and complete information from a variety of sources.

David J. Ballard
Jackson, Mich.

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VIEWPOINT

Software escrow not a guarantee for protection

READER'S PLATFORM
L.J. Kutten

The article "Firm utilizes software escrow for access control" [CW, Oct. 29] gives the unwarranted impression that software escrow can be a panacea that will protect a software developer's proprietary information while at the same time guaranteeing "access by interested parties in case of product discontinuance, bankruptcy, theft and copyright and trade secret infringement."

Based on my research, this just is not always true. As an analysis of each issue could easily take 70 pages, I will explain the ramifications of a software developer's bankruptcy on a software escrow agreement.

For the purpose of further discussion, the three following assumptions are required:

- The software developer (the escrower) has filed for bankruptcy, either voluntary or involuntary, or for corporate reorganization.
- A bankruptcy trustee has been appointed, and the escrow agreement calls for delivery.
- The agreement calls for delivery of the escrowed material upon the escrower's filing for bankruptcy.

Unless the escrow company has been formally authorized to take charge of the debtor's property for the general benefit of the debtor's creditors (usually by contract or court order), it is deemed a noncustodian of the debtor's property. Typical noncustodians include bailees, pledgees, a co-owner and an escrow holder.

As long as the debtor retains any title to the property at the time of the bankruptcy filing, the property belongs to the debtor's estate. This property includes all property in which the debtor has any legal or equitable interest, including any interests in copyrights, patent rights, trademarks and trade secrets.

Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.

If the escrow company is a custodian and has knowledge of the bankruptcy, then under 11 U.S.C. 543, it must take appropriate steps to preserve and protect the property (for example, refuse to turn it over to the software consumer), and it must turn the property over to the trustee.

So long as the debtor retains any title to the property at the time of the filing, the property belongs to the debtor's estate. This property includes any interests in copyrights, patent rights, trademarks and trade secrets. Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.

The fact that the escrow beneficiary has a contract with the debtor/escrower is unimportant. Under 11 U.S.C. 365 (a), a bankruptcy trustee may assume or reject an executory contract (that is, a contract in which both sides have a future obligation).

For example, Select-A-Seat Corp. developed and marketed a software package that allowed for remote sales of athletic and entertainment tickets (625 F2d 290, 9th Cir. 1980). In November 1975, Select-A-Seat sold exclusive rights to Fenix to use and license others to use Select-A-Seat's software. This right was contingent upon Fenix paying Select-A-Seat $140,000 plus a promise to pay 5% of the income generated for 10 years. In addition, Select-A-Seat promised not to provide the program to any other party.

On Dec. 3, 1976, Select-A-Seat filed for bankruptcy. On May 19, 1977, the trustee rejected the licensing agreement as executory. Fenix appealed, claiming it was not executory because it had paid and received an exclusive license to the program. The appeals court reject this and said the contract was executory because Fenix had a continuing duty to pay a royality, and Select-A-Seat had a duty not to license others to use the program.

As a result, the trustee was allowed to sell and/or license the program to others. As a general rule, if the software is usually updated, and the updating is required by contract, that contract is executory. If it is executory, the software license agreement can be rejected. If it is rejected, the license cannot protect the nondelivery of the escrowed material.

Trustee may sell debtor's assets to third party

The trustee can also sell the assets of the debtor to a third party, notwithstanding any provision in the original escrow agreement or licensee agreement to the contrary.

The only caveat is that where the debtor only holds legal title to the property and it is being held for the benefit of another, the trustee may not sell the property if the sale will be detrimental to the beneficial owner [see 11 U.S.C. 541(b)].

It should be noted that bankruptcy law 11 U.S.C. 541(c) specifically prohibits any contract language that purports to transfer the property of the debtor to any other party that is "conditioned on the insolvency or financial conditions of the debtor . . . or on taking possession [of the assets] by a trustee."

Finally, an escrow beneficiary cannot immediately sue the escrow service or the supplier in a local court to compel delivery of the source code and documentation.

The bankruptcy court has exclusive jurisdiction over all property of the debtor and all issues and cases that affect or concern the property of the debtor. If the user wants to sue, he must do so in a bankruptcy court. ‡

Kutten is a computer law consultant and a member of the Illinois and Missouri Bars. He is the author of the Computer Buyer's Protection Guide.

DP center must gird for challenge of OA implementation

HUMAN CONNECTION
Jack Stone

Automating the office has become a mighty challenge for the best of today's technical minds. The issue of dealing with the convergence of word processing and data processing technologies, which have dominated the industry for so long, has been compounded by the necessary consideration of multiple technologies that have either reached a reasonable level of maturation or will do so soon.

These days, it does not make sense to initiate office automation planning without taking into account the many cost-beneficial alternatives (and the following list is not intended to be all-inclusive):

- Electronic mail systems configured with facsimile devices and optical character scanners to transmit combined typewritten and handwritten text plus graphics material.
- Devices of various levels of intelligence for remote access to office-level computer facilities, including notebook computers and cellular radiotelephones.
- Powerful personal computers with integrated applications software and a broad range of communications add-ons.
- Combined voice, data and video workstations and switching devices for a variety of applications within local-area networks.

Rapid-fire OA developments

In spite of these rapid-fire developments, many leaders of large organizations do not appreciate that, nowadays, the complexities of systems planning for office automation projects are approaching those of large-scale mainframe projects. This should not come as a great surprise because of the growing processing power of office systems.

Therefore, to do the OA planning job right, the organization requires much the same kind of talent that is found in the DP center systems analysis department. And that's where the executives figure they will go to pry loose the OA analysis capability. If your DP center has not yet felt the pressure to divert preciously guarded systems people to OA, then take heed — they soon will.

Not surprisingly, OA analysts have difficult tasks ahead because, as is the case for mainframe systems analysts, their attention is directed as much to management, personnel and organizational matters as to issues dealing with the technology. The first need in this situation is to identify realignments in the current flow of information processing to take full advantage of the new OA connection. This effort is, of course, well established in the mainframe systems planning cycle. Such changes may require as little as a few minor modifications in existing manual procedures or as much as a divisional reorganization.

But as we have all come to learn, mostly the hard way, getting office users to change the ways they have done business, however slightly, is not accomplished overnight and may take years, particularly when manual procedures have been operative for decades.

To implement such changes, OA analysts must be unusually gifted in dealing with people. They should be able to relate easily to office users during the entire systems development process and be available to offer assistance to make users' jobs easier and their time more productive. OA analysts ought to be capable of convincing managers and supervisors of the value of an OA project by relating the prospective implementation of new technologies to one of the following:

- Improvements in operations.
- Decreases in operating expenses.
- Expansions in services to customers or constituencies.

Finally, the OA analyst should be experienced in training and possessed of the patience and sensitivity necessary to deal with non-DP-oriented professionals in an effective way during OA implementation. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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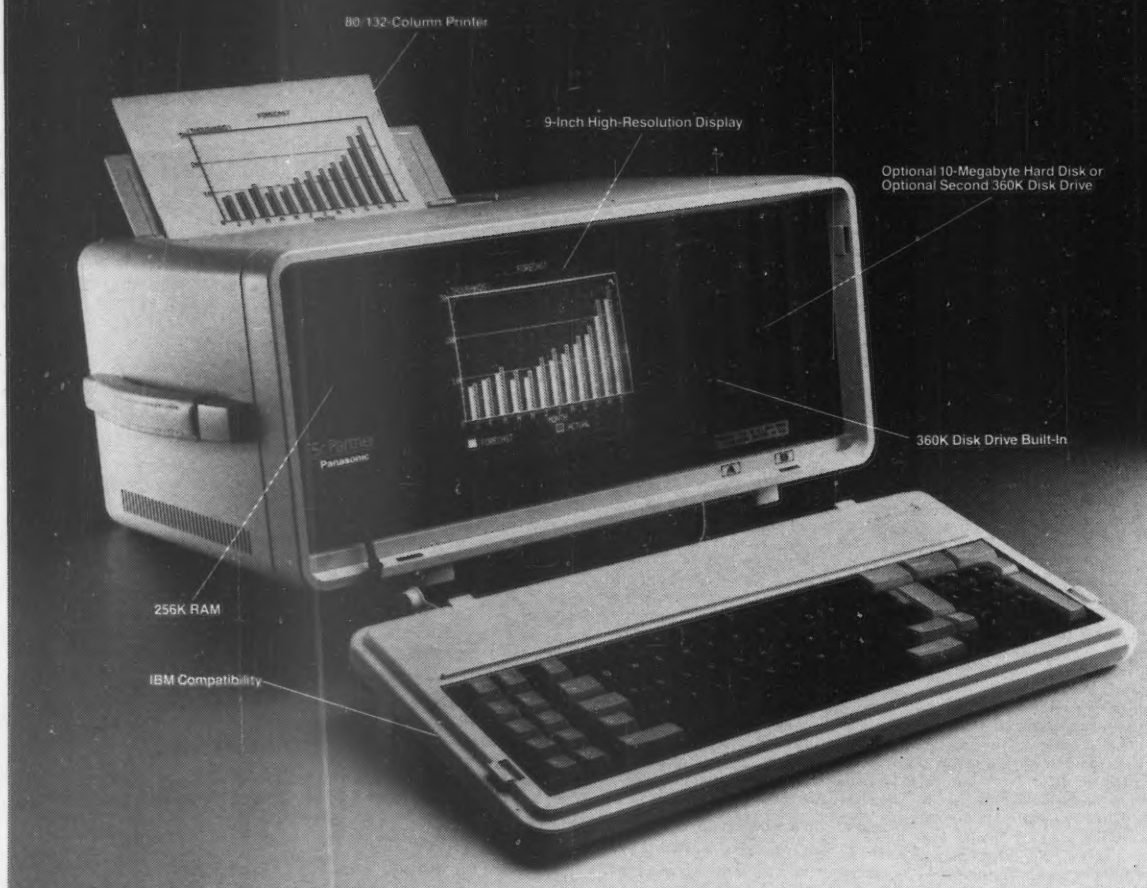

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50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User _____

Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor _____

2. OCCUPATION/FUNCTION (Circle One)
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12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
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51 Mfg Sales Reps/Sales/Marketing Mgmt
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70 Medical/Legal/Accounting Mgmt
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Types of equipment with which you are personally involved either as user, vendor or consultant
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C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

SOFTWARE & SERVICES

Hobbyist makes program development look easy

By Paul Gillin
CW Staff

TULSA, Okla. — At Clyde Petroleum, Inc. here, petroleum engineer Jack Coursey is bringing new meaning to the words "end-user computing." Coursey, a longtime computer hobbyist with no formal DP training, has replaced a data base application originally written on an IBM System/34 with a similar one he developed on an IBM Personal Computer XT using a high-level programming language and data base management system.

Coursey's application is a storage and retrieval program for production data for oil and gas wells. The data base encompasses information about oil, gas and water production data, test data, lease background information and information about division of interests. It will eventually encompass about 700 wells. Coursey used Information Builders, Inc.'s PC/Focus to build the data base.

With no experience in formal development, Coursey basically used the prototyping capabilities of PC/Focus to make changes.

The application uses three data bases that can be dynamically linked for reporting, Coursey said. The data bases include lease data, production and test data associated with leases and an inventory data base of field equipment. "If I want the total history of a well sorted by county, for example, I have to pull more than one data base to do it," he said. "I've got well over 200 leases on the data base right now."

To handle the size of the data base, Coursey added a Tallgrass Technologies Corp. 45M-byte hard disk to the Personal Computer XT. The engineer relied largely on past experiences and common sense to design the application. "You basically draw a flow chart of how you want to look at data, and that's how you want to store it," he said.

To test for accuracy, Coursey wrote programs on PC/Focus that generated reports similar to those already employed on

See **FOCUS** page 38

SOFTLINE
T. Capers Jones III

Productivity gauge changing

Since 1981, a new kind of software productivity benchmark called "function points" has started to replace "lines of source code" as a standard measure for software productivity. The reasons for this, and what is likely to result from the switch, are turning out to be very significant.

From the time that software production began more than 30 years ago, measuring the productivity of software projects has been a major problem. During the early years of professional programming, measurements based on lines of

See **MEASURE** page 36

Jones is a consultant for Nolan, Norton & Co. in Lexington, Mass., and the author of two books and more than 30 articles and reports on software quality and productivity. He is a regular contributor to Softline.

■ Computer Associates International, Inc. has announced Release 2.1 of the CA-Universe relational data base management system/**34**

INSIDE

Systems Software/**34**

Micro Tempus revamps micro-mainframe link

MONTREAL — Micro Tempus, Inc. has announced what the company labeled a totally redesigned version of its Tempus-Link microcomputer-to-mainframe link that features improved performance and additional functions.

According to a spokesman, Version 3.1 of Tempus-Link offers performance capabilities that include more efficient use of terminal buffers, shorter path lengths between modules and improved translation and compression algorithms. The performance features are said to increase mainframe capacity and capability. Tempus-Link supports a variety of mainframe operating environments, including IBM's CICS, TSO and CMS and the entire line of IBM and IBM-compatible micros.

The spokesman said other additions to Tempus-Link include a translation table, a conversational tutorial and full screen presentation and windowing capabilities that make the link easier for end users to operate. Version 3.1 also comes with the Tempus-Link Application Program Interface (API) and Host Application Program Interface (Hapi).

Permit integration of environments

The two interfaces permit integration of the micro and mainframe environments. They allow the user, for example, to write micro programs that call mainframe applications as subroutines, which are then reportedly transferred to the micro program transparently to the user.

The spokesman said Version 3.1 also allows users to configure programs according to a variety of options. Beginners are guided through a series of tutorial menu choices when they access the system, and experienced users can move more quickly through Tempus-Link by bypassing familiar options, the spokesman said. An additional enhancement to the system, which the spokesman described as a statistics capability, enables users to generate information about the transmission of data, including speed and efficiency of data transfer, number of errors and other information.

Version 3.1 of Tempus-Link is priced incrementally on the basis of maximum concurrent users. A basic five-user version is priced at $6,175. A 100-user version costs $39,000. The next increment of 100 users is priced at $11,700. Users of the complete Tempus-Link 2.0 product, including Hapi and API, can upgrade to Tempus-Link 3.1 at no charge. Other Tempus-Link users can upgrade to Version 3.1 for a 30% charge as long as their minimum configuration is five users.

Micro Tempus is located at Suite 300, 440 Dorchester Blvd. W., Montreal, Quebec, Canada H2Z 1V7.

AT&T compiles Unix definitions for software developers

NEW YORK — AT&T Information Systems has announced that it will publish a definition document for its Unix System V. The document is intended to serve as a guide for software developers who want to write applications that are portable across the various System V implementations.

The "System V Interface Definition" will define a minimum set of system calls and library routines that should be common to all operating systems based on Unix System V. The initial document will be released in January at a nominal charge, according to an AT&T spokesman. It will be followed by further papers defining optional extensions to the basic definition.

The communications giant also said it will offer a service to help system developers conform to the System V Interface Definition. The service will be made available to System V licensees during 1985. It will test implementation of Unix System V for conformance to the definition.

Boasting a solid commitment

"It is letting the entire computer community know that [AT&T is] solidly committing [itself] to a standardized System V Unix," said Harry Layton, software systems product verification manager for AT&T Technologies.

Unix observers and software developers said the announcement should not be taken as a significant statement about Unix. "I think it's a non-event," said David Fiedler, editor of "Unique," a Unix newsletter. "I don't think it's anything new because it's stuff that's been available all along."

However, Fiedler said the specifications should provide some reassurance to developers. "Before, they could just copy the system calls. This gives them an added reassurance that what AT&T says is going to be the actual interface."

Jeff Stives, marketing communications manager at Plexus Computer, Inc. said the usefulness of the standard will depend upon AT&T's commitment to adherence. "For the moment, issuing a spec and adhering to it are two different things," he said. But he added, "Each time AT&T ups the ante on Unix, it benefits our market."

CA-Universe upgrade released

JERICHO, N.Y. — Locking algorithms, IBM Vsam transparency and support in IBM's VM/CMS for multiple minidisks are among the enhancements included in Computer Associates International, Inc.'s Release 2.1 of CA-Universe relational data base management system.

According to the company, users of IBM's DOS/VSE do not have to modify programs using Vsam files while CA-Universe's transparency feature is being used.

All security and recovery systems, such as IBM CICS journaling and CICS automatic transaction backout, reportedly continue to run while the system's transparency capabilities are utilized. In addition, the release is said to require no modification to CICS or CICS functions.

Supports multiple disks

The enhanced release is said to support multiple minidisks within VM/CMS or the CA-Universe data base. A multiextent data set has been implemented so that one data base table can now span multiple minidisks, the company said.

CA-Universe is priced at $140,000 for IBM's OS/VS, MVS and VM/CMS operating systems. The product costs $110,000 for the DOS/VSE environment.

Computer Associates International is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

SYSTEMS SOFTWARE

CALIFORNIA SOFTWARE, INC.
Netman 3.0

California Software, Inc. has released a version of its on-line data communications and data center management system.

Netman 3.0 is said to include more than 50 enhancements, including reverse paging, faster mass updating capabilities and a faster response time. The new version also includes an optional On-line Customization Facility. The product supports IBM's MVS/TSO, MVS/CICS, VS1/CICS, VM/CMS and DOS/VS/CICS.

The software update is available to Netman users free of charge. The On-line Customization Facility will be offered to existing users until Dec. 31 at $15,000 for a perpetual license. After that date, the price of the option to existing and new users will be $20,000. A perpetual license for the Netman 3.0 for the MVS operating system remains at $37,500.

California Software, 3232 Nebraska Ave., Santa Monica, Calif. 90404.

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link enhancement

Unique Automation Products, Inc. has announced that its UAP-Link micro-to-mainframe communications software now runs with Digital Equipment Corp. VAX-11 systems under DEC's VMS operating system.

According to the vendor, UAP-Link now permits VAX systems to transfer files to another VAX or to control groups of micros or interconnect with other vendors. The link is said to work on IBM Personal Computers and compatibles, DEC Rainbow microcomputers running under Microsoft Corp.'s MS-DOS operating system and Digital Research, Inc.'s CP/M 86 operating system.

It also runs with DEC's PDP-11 minicomputer, as well as under Unix operating systems, IBM's VM/CMS operating system and Data General Corp.'s AOS/VS operating system, the company said.

The new release includes both control and host modules and is priced at $1,250.

Unique Automation Products, Suite G, 15401 Red Hill, Tustin, Calif. 92680.

NETWORK APPLICATIONS, INC.
Transnet enhancement

Network Applications, Inc. has announced that its communications software now runs with office systems from Digital Equipment Corp. and Data General Corp.

According to Network Applications, through the use of IBM's Document Interchange Architecture and Document Content Architecture, Transnet allows multiple-vendor office systems to communicate through the host's IBM Systems Network Architecture Distribution Services. Transnet permits office systems from IBM, Wang Laboratories, Inc. and Xerox Corp. to exchange text documents, which can then be edited by any of the systems.

In addition to DG's CEO office system and DEC's All-In-One office system, electronic mail systems from the two companies will also be usable with any Transnet-supported systems from DEC, DG, IBM or Wang Laboratories.

Transnet has a base price of $35,000.

Network Applications, 9020 Capital of Texas Highway N., Austin, Texas 78759.

WHITESMITHS, LTD.
Enhancements to Pascal and C compilers

Whitesmiths, Ltd. has announced that its Pascal and C compilers for IBM 370 mainframes have been enhanced to provide optional cross-compiler support. The company also announced that the compilers are now available for IBM's VM/CMS.

According to the company, the optional cross-compilers support the Intel Corp. 8080 and 8086 microprocessors and Motorola, Inc.'s 68000 microprocessor.

Each cross-compiler reportedly can generate free-standing programs. The 8086 option can also generate programs executable under IBM's PC-DOS operating system, the company said. The 8080 processor supports Digital Research, Inc.'s CP/M 80, and the 68000 option supports Digital Research's CP/M 68K-byte operating system, according to Whitesmiths.

The VM/CMS option is standard with the C/370, priced at $5,000. Each of the cross-compilers is priced at an additional $5,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

ADVANCED SYSTEMS CONCEPTS, INC.
Status/38

Advanced Systems Concepts, Inc. has announced a resource accounting product said to be compatible with the IBM System/38 under Release 6.0 of the CPF operating system.

The accounting features of Status/38 reportedly track all facets of system use. Total job execution time, CPU use time, response time, printer and paper use and disk space utilization are included, the company said. The product reportedly allows jobs to be grouped for departmental reporting.

Status has a one-time license fee of $1,500, the vendor said.

Advanced Systems Concepts, Suite S, 1350 Remington Road, Schaumburg, Ill. 60195.

See SYSTEMS page 37

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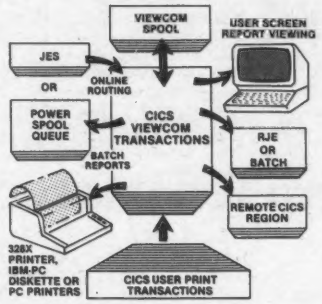

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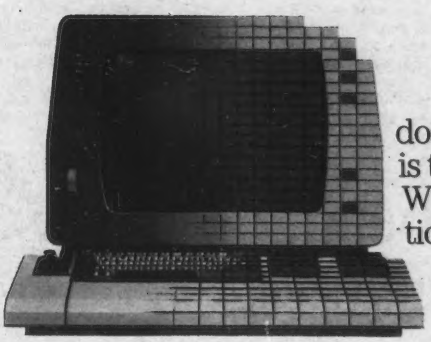

It's a rare data processing department that doesn't have a backlog of applications, and nowhere is the problem more acute than among 4300 users. With fewer people typically to develop applications, fewer applications typically have gotten developed.

Adding more applications developers might seem one way to combat the problem. But we'd like to suggest a more sensible approach. A way to enable you to get more productivity out of your existing dp staff. It's called IDMS/R.

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	Assembler version	Pascal version
Source Statements	10,000	2,500
Requirements/Design	10 months	10 months
Coding	50 months	10 months
Testing	20 months	10 months
Documentation	10 months	10 months
Management/Support	10 months	10 months
TOTAL	100 months	50 months
Lines of Source Code per Month	100	50

Figure 1

Function Points			
Number of Inputs	X 4	=	
Number of Outputs	X 5	=	
Number of Inquiries	X 4	=	
Number of Data Files	X 10	=	
Number of Interfaces	X 7	=	
FUNCTION POINT TOTAL			

Figure 2

MEASURE from page 33

source code worked relatively well. In those days, when assembler languages were the only ones available, the phrase "a line of source code" had a fairly clear definition: It was in fact a single source code statement, and it occupied a single line on a coding sheet.

However, with the arrival of Cobol, Fortran and the other compiler-based languages, a set of major problems arose that caused ambiguity about lines of source code.

While the unit of measure "lines of source code" continued to be the standard measure of productivity, it no longer had a precise definition, and the same program could vary by more than 10:1 in apparent size simply by changing the rules of line counting.

The real problem

Ambiguities in line counting are only a superficial problem and could be resolved by adopting standards. However, there is a much more serious problem with benchmarks based on lines of source code than a simple lack of standard definitions. The real problem is that such a benchmark does not work across different source languages and indeed penalizes high-level languages in direct proportion to the level of the language.

The reason for the penalty is analogous to a classic industrial phenomenon: If a manufacturing process has a high percentage of fixed costs and there is a decline in the number of units produced, then the cost per unit goes up. In software development, there are a great many activities that are not exactly fixed costs, but are not directly related to coding either: requirements, design, user documentation and so forth.

For example, assume that two identical programs are to be written — one in assembler language and the second in Pascal (see Figure 1).

Paradox occurs

Note the paradox that occurs: While the high-level language reduced the total development effort by 50% and improved true economic productivity by 50%, if productivity is measured in terms of lines of source code per month, then the improvement disappears, and the assembler language version looks twice as productive.

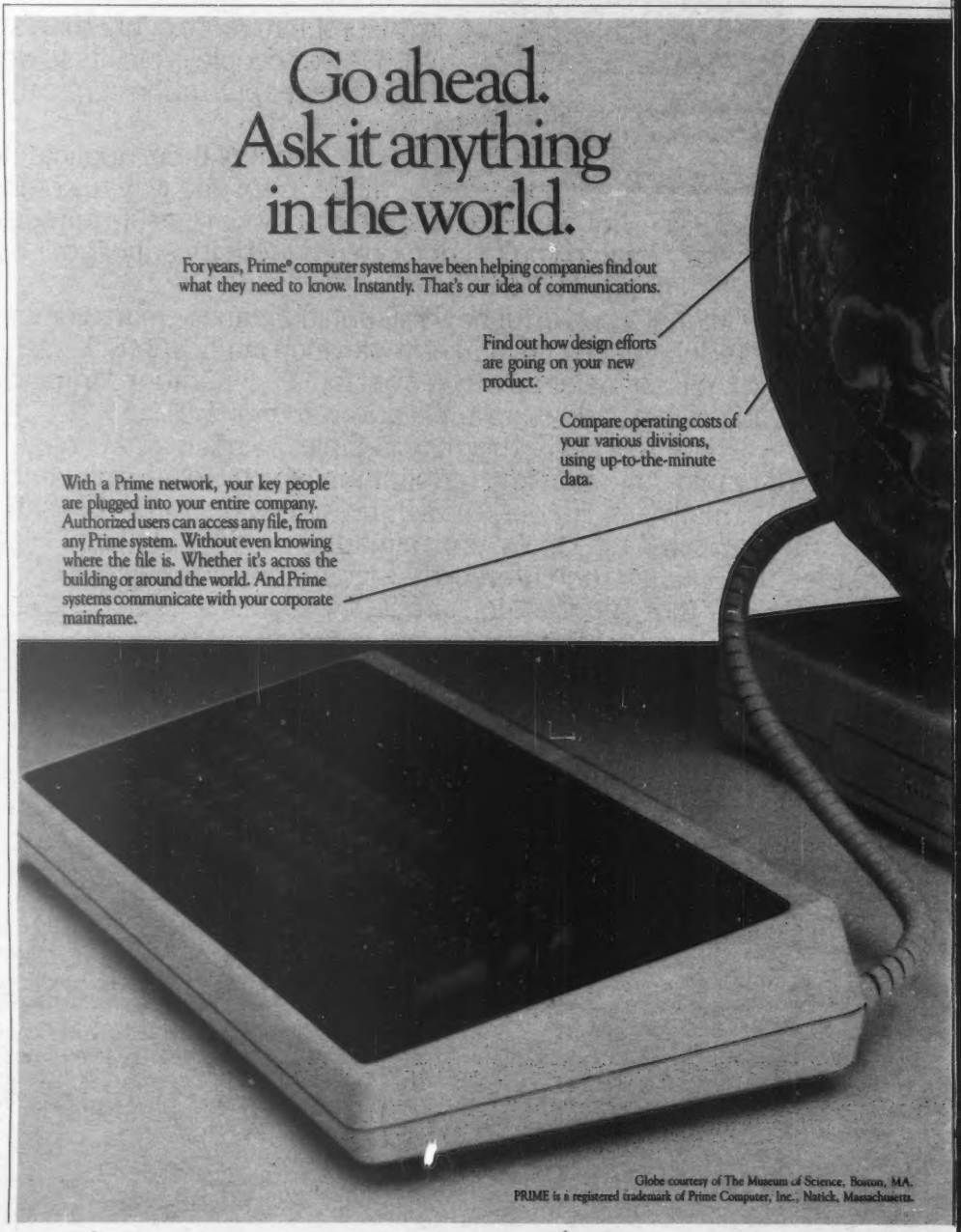
In the late 1970s, Allen Albrecht of IBM had to confront this productivity paradox. As a manager within IBM's Data Processing Services group, he was looking for a way to measure productivity that would work across multiple languages: assembler, Cobol, RPG, IBM's DMS/VS and many others.

What he came up with has come to be called "function points," the weighted sum of five major external attributes of a software program (see Figure 2).

There are some other attributes of the function point method that deal with adjustments for complexity, but they are not needed to understand the fundamental concept. Essentially, function points are like the Dow Jones market indicators — a composite number that can indicate useful trends.

Look at the previous assembler and Pascal examples in terms of function points. For both versions, the function point total will be the same. In this case, assume one of everything (see Figure 3).

Considering the previous assembler and Pascal examples, the 100 months it took for the assembler lan-



guage version can now be expressed as 0.3 function points per month. The 50 months it took to do the Pascal version yields a function point rate of 0.6 function points per month, or twice the function point rating of assembler.

For the first time in the history of computing, software productivity has a benchmark that reflects economic productivity without the mathematical paradoxes associated with measurements based on lines of source code.

Reason for significance

This is the reason why the function point method is becoming so significant: It can show the value of high-level languages in a way that is relatively free from distortion.

Not only can the function point method demonstrate the value of high-level languages, it can be used to predict the size of a program as well, in any language. For example, the approximate number of source code statements per function point for a few common languages are shown in Figure 4.

Although the current margin of error of the source code-to-function-point ratio is high, even the possibility of an accurate measure that can be used early in development is a very exciting occurrence.

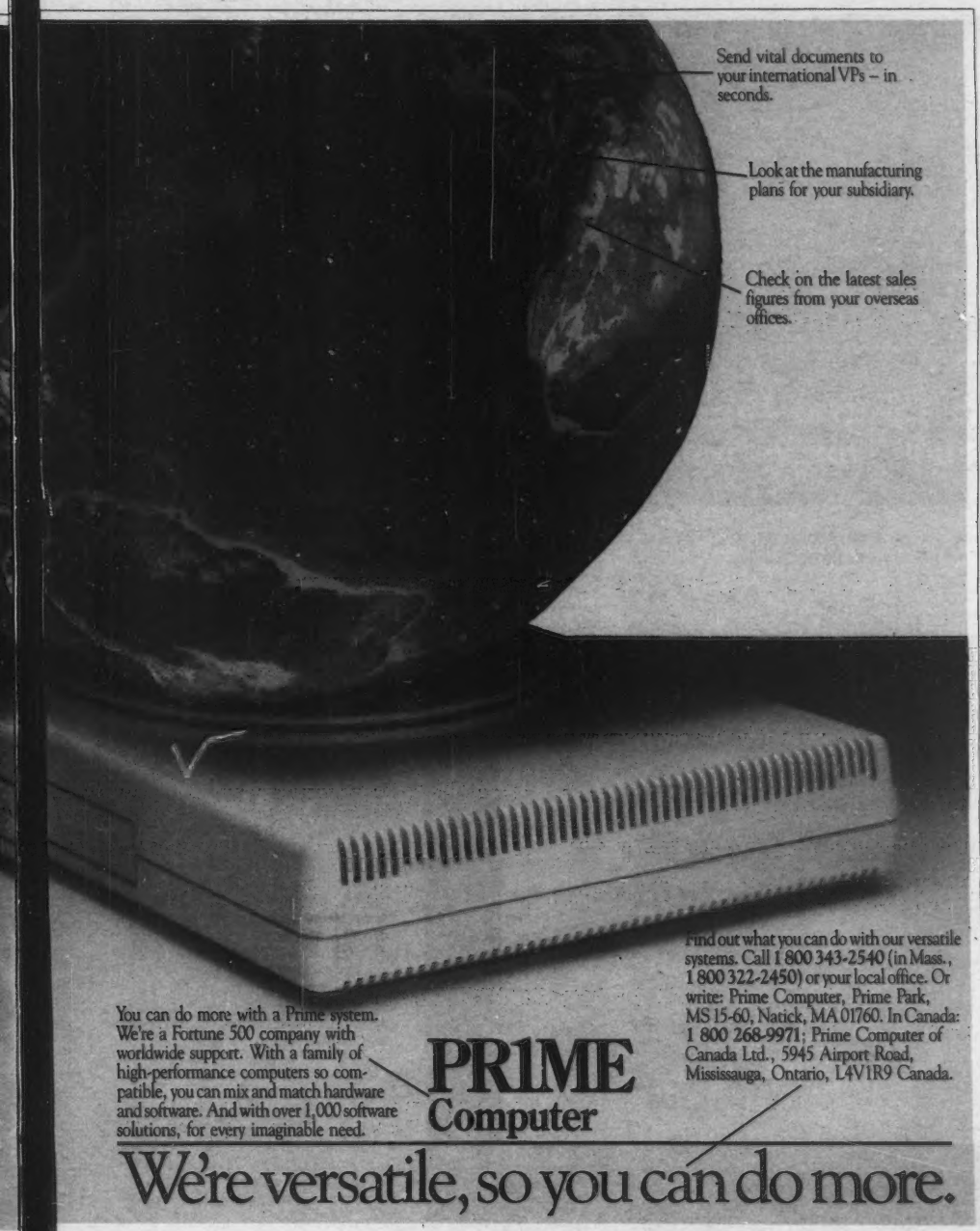
The function point method is still evolving. Not only that, but the function point method has its own sources of ambiguity, and the exact definition of some of its terms, such as "inputs" and "outputs," has required a great deal of effort. Even so, the potential value of the method makes it worthy of serious exploration.

Number of Inputs	1 X 4	=	4
Number of Outputs	1 X 5	=	5
Number of Inquiries	1 X 4	=	4
Number of Data Files	1 X 10	=	10
Number of Interfaces	1 X 7	=	7
FUNCTION POINT TOTAL			30

Figure 3

• Assembler Language	= 320 statements per function point
• Cobol	= 105 statements per function point
• Pascal	= 90 statements per function point
• PL/I	= 65 statements per function point
• DMS/VS	= 25 statements per function point

Figure 4



SYSTEMS from page 34

VIRTUAL MICROSYSTEMS, INC.
Bridge enhancement

Virtual Microsystems, Inc. has announced that its Bridge development system now permits Intel Corp. development languages to run on Digital Equipment Corp. VAX-11 computers.

By using the Bridge, users reportedly can compile and run Intel PL/M-86 programs from any terminal attached to a VAX-11 or other DEC minicomputer system. The program is said to allow user to work at exiting terminals and exchange programs and data via the DEC VMS operating system utilities.

Price per system is $9,900.

Virtual Microsystems, Suite 300, 2150 Shattuck Ave., Berkeley, Calif. 94704.

BUSINESS COMPUTER DESIGN, INC.
Telex-Mint

Business Computer Design, Inc. has announced a software package that reportedly gives telex processing capabilities to IBM System/34, 36 and 38 minicomputers.

The Telex-Mint communications package reportedly allows users to create telexes, cables and mailgrams from any workstation using full on-line text editing. Communications characters are said to be generated by Telex-Mint and carried over the ITT Databridge communications network. According to the company, users can send to any telex acceptance machine at rates of 2,400 bit/sec to 4,800 bit/sec with an AT&T-compatible modem.

The introductory fee for the Telex-Mint system is $1,950 for the System/34 and System/36 and $2,850 for the System/38.

Business Computer Design, 9000 Jorie Blvd., Oak Brook, Ill. 60521.

MT XINU, INC.
Enhanced 4.2BSD

Mt Xinu, Inc. has released source code software for the University of California at Berkeley 4.2 version of the Unix operating system, 4.2BSD, that adds a debugger, performance enhancements, utilities and device support. Dubbed Enhanced 4.2BSD, the system runs on Digital Equipment Corp.'s VAX-11 computers and

Continued on page 38

Continued from page 37

various 32-bit microcomputers, including systems developed by Sun Microsystems, Inc. and Masscomp Co.

The company offers ongoing source maintenance and binary redistribution rights to purchasers of its Enhanced 4.2BSD source software.

The price of the Enhanced 4.2BSD system is $10,000.

Mt Xinu, 739 Allston Way, Berkeley, Calif. 94710.

PRECISION VISUALS, INC.
HP 7550 device driver

Precision Visuals, Inc. has announced a device driver coded in Fortran that permits users of the device-independent Precision Visuals DI-3000 and GK-2000 graphics tools packages to utilize the Hewlett-Packard Co. HP 7550 plotter.

Capabilities supported by the driver include 40 character fonts, nine markers, 14 line styles and the plotter's automatic paper load feature. To access the hardware functions of the HP 7550, the driver converts all DI-3000 or GK-2000 subroutine calls into the appropriate HP graphics language commands.

The HP 7550 device driver is priced at $500 and includes documentation and source code.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

STAFF COMPUTER TECHNOLOGY CORP.
The Key

Staff Computer Technology Corp. has introduced The Key, an access control and software security system that reportedly operates on any computer equipped with an RS-232 interface.

The Key achieves access control by using different inquiry/response pairs each time a terminal user requests access. The mainframe contains the master key, and each terminal requiring controlled access contains unit keys.

Software suppliers attain security by tailoring demonstration software to a specific key. The Key can be installed on any machine the demonstration works on. Users can copy the diskette and back it up, but the software and copies cannot be used without The Key.

An evaluation unit for access control includes master and unit keys and is priced at $399.

Staff Computer Technology, Suite J, 10457 Roselle St., San Diego, Calif. 92121.

DIGITAL INFORMATION SYSTEMS CORP.
DBL Version 4 on Unix

Digital Information Systems Corp. has announced that its DBL language now runs under AT&T's Unix operating system.

According to the company, Version 4 of DBL offers the ability to chain to non-DBL programs and to interface to subroutines written in other languages. Multikey IBM Isam files, full screen programming functions, a fixed-point decimal data type and a symbolic debugger are included with the system.

DBL Version 4 pricing starts at $449 for micros and ranges up to $3,549 for superminis.

Digital Information Systems, Suite 340, 3336 Bradshaw Road, Sacramento, Calif. 95827.

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BYTE Magazine Sieve Benchmark

In a comparison of Ryan-McFarland COBOL 1.6A, Micro Focus COBOL 2.0 and PHILON FAST/COBOL 1.0 using the *BYTE* Magazine sieve benchmark the results are conclusive: PHILON FAST/COBOL executes the benchmark 24 times faster than Micro Focus and 47 times faster than RM/COBOL. (System configurations; 68000/UNIX/8mHz/1wait state.)

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PHILON™

FOCUS from page 33

the System/34. Before moving actual production data onto the Personal Computer XT, he ran reports from both machines using test data on the Personal Computer XT and compared the results.

Coursey has done no formal testing of the application. "Most of the data we use is pretty straightforward," he said. "If there's an inconsistency, it really jumps out at you."

Admitting that he has no experience in formal development, Coursey said he basically used the prototyping capabilities of PC/Focus to make changes as he went along. "I have an idea of the ultimate goal, and I work toward it," he said. "The program logic and code probably could be better, but it does what I want."

Accommodating changes

A relational data base structure was particularly helpful in accommodating frequent changes, he said. "One of the advantages of the relational data base is that I've made a lot of screwups in designing this," he said. "I've left out fields, and the relational data base has let me rebuild them easily. It grows with you."

The application is almost entirely menu-driven. "The user has no interface directly with PC/Focus," he said. He noted that he has not written any documentation for the program. "The documentation basically consists of turning the machine on," he said. While that does not present a problem as long as he works at Clyde Petroleum, Coursey admitted that "If I were to leave, and modifications needed to be made, it could be a problem. We would need a DP-type to take up where I left off."

Coursey chose PC/Focus from a list of four or five alternatives, including Ashton-Tate's Dbase II and Micro Data Base Systems, Inc.'s MDBS. "There are a lot of data bases, but I don't think [there are] any with as many bells and whistles as PC/Focus," he said. In addition, the product offered upward compatibility with mainframe Focus. "If the company grows by leaps and bounds and we have to transfer the application to the mainframe, we can do it," he said.

Coursey said PC/Focus was "difficult to learn from an end-user standpoint. It will do most of what I want [it] to do, but there are a lot of intermediate steps you have to take in order to make a program operate properly," he said.

COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

T1 users may elude 'leaky' PBX charge

Users of digital T1 communications facilities may be sidestepping the $25 surcharge now being levied on private-line facilities by local telephone companies.

This surcharge went into effect last month and is meant to compensate local telephone companies for the so-called "leaky" private branch exchange (PBX) problem. A PBX is considered to be leaky when it is tied to a remote PBX or telephone company central office with a leased line, circumventing local dial-up circuits and their associated customer access line charge.

The $25 surcharge is being applied to all private lines unless the user can prove that the circuit qualifies for exemption. Exemption is granted for circuits that are terminated by devices that are incapable of rerouting traffic into the telephone network. Generally, this means that point-to-point leased facilities that are used in data applications will not carry a surcharge, whereas the same line used to tie together remote PBXs will be subject to the charge.

While it is a relatively easy matter for telephone companies to verify circuits that should carry the surcharge, it will be more difficult for the local exchange carriers to police T1 carrier use. These digital facilities operate at 1.54M bit/sec and can be subdivided into a number of individual subchannels, typically 24 channels operating at 64K bit/sec.

Because the link is digital, data and digitized voice can be accommodated with equal ease. The data circuits, however, won't normally be subject to the $25 surcharge, and the voice circuits will, creating a potentially unmanageable situation. As one user quipped at a recent conference while discussing the digitized voice channels on a T1 link, "those aren't voice channels, they're 64K bit/sec data channels."

With the onus on the user to apply for surcharge exemption, most companies are

See **CIRCUIT** page 42

Interface extends boundaries of insurer's electronic mail

FORT WAYNE, Ind. — Electronic mail users at an insurance company here are now able to send messages outside of the company using an interface that is modeled after a developing standard.

Lincoln National Corp. tailored the interface for its private electronic mail network after MCI Mail Link, a specification developed by MCI Digital Information Services Corp. The insurance company has been using the interface specification — which was officially unveiled this month — since June, according to James Tunis, telecommunications director. Licensing rights for the interface will become commercially available on a license basis in April.

Without the interface it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome.

The specification is a forerunner of an electronic message network interface standard, known as X.400, now under development.

"It will be at least a couple of years, however, before the final version of X.400 is implemented by vendors of electronic mail systems," explained Bob Harcharik, president of the MCI Communications Corp. subsidiary. The Mail Link specification, he added, provides a way for private networks to communicate with each other during the interim.

Lincoln National is one of two beta test sites for the MCI Mail Link specification. The other is Citibank, N.A., in New York. In each case, the interface connects in-house users with MCI Mail, the international public electronic mail network operated by Harcharik's organization. MCI Mail, in turn, provides access to other private and public message networks, to TWX/telex terminals and to laser-driven printers that output hard-copy messages for delivery to those without terminals.

Without the new interface, explains Tunis, it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome, requiring special logon and logoff procedures. Also, the user generally is unable to get an acknowledgement that his message was received.

See **MAIL** page 42

International Zapmail agreement awaiting FCC stamp of approval

MEMPHIS — Fedex International Transmission Corp., a subsidiary of Federal Express Corp., has applied to the Federal Communications Commission for authority to provide international document transmission between the U.S. and Belgium and the U.S. and England.

A company spokesman said the applications include agreements with the communications governing bodies in Belgium and England to extend Federal Express' Zapmail service into those countries beginning in the spring of 1985.

The spokesman said that because of the time zone differences between the two continents, the international service would be a next-day service from the U.S. to Europe and a same-day service from Europe to the U.S., rather than the two-hour delivery that Zapmail promises for domestic document transmissions.

- Computime, Inc. has announced a data collection and software product for use on IBM mainframes serving retail point-of-sale and banking terminals/**40**
- Micom Data Systems, Inc. has announced a 14.4K bit/sec full-duplex, leased-line modem capable of accelerating to 16.8K bit/sec/**40**
- Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users/**41**

INSIDE

Voice/Data Communications/**40**
Protocol Converters/**40**
Software/**40**
Multiplexers/ Modems/**40**
Network Services/**41**
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AT&T to launch 21,000-mile cable project

BASKING RIDGE, N.J. — AT&T Communications recently announced plans to construct a lightwave communications backbone to interconnect most major U.S. cities and to traverse the Atlantic and Pacific oceans by 1990. In addition, the company said, it plans to expand its digital microwave radio network and convert 4,500 miles of its coaxial network to digital transmission.

A company spokesman said the project to add 21,000 miles of fiber-optic cable is made possible by the improved cost-effectiveness of the technology. He noted that while fiber-optic regenerators were once necessary every few miles, they can now be spaced 24 miles apart.

"AT&T will construct the world's largest fiber-optic telecommunications network by the end of this decade," said Robert W. Kleinert, president and chief operating officer of AT&T Communications.

AT&T said it will use single-mode lightwave systems on all new routes, and that by 1988 the systems will operate at 1.7G bit/sec and transmit up to 169,344 simultaneous conversations.

The lightwave systems will provide voice, data and video transmission between AT&T digital switching machines in major cities. The company already has lightwave systems connecting Boston to Washington, D.C. and San Francisco to Bakersfield, Calif. Other cities will be added to the network in phases through 1988.

The company said that by 1988 it will have installed the majority of the first transoceanic lightwave system. This project, known as the TAT-8 system, will link Tuckerton, N.J. with Widemouth, England, and Penmarch, France. AT&T said it plans to connect California with the western Pacific via Hawaii and Guam by late 1988 or early 1989.

Satellite net to relay financial information

NEW YORK — E.F. Hutton & Co. and Equatorial Communications Co. have announced an agreement for a private satellite-based communications network to be used to transmit customer account information and real-time securities information among 400 E.F. Hutton offices in the U.S.

The system, utilizing a 9.6K bit/sec satellite channel, will also allow E.F. Hutton to download software on a point-to-multipoint basis to its offices, which will be equipped with Data General Corp. MV4000 minicomputers.

Equatorial will supply the earth stations and services for the hybrid satellite/terrestrial net.

E.F. Hutton is located at 1 Battery Park Plaza, New York, N.Y. 10004; and Equatorial Communications is at 300 Ferguson Drive, Mountain View, Calif. 94040.

COMMUNICATIONS

VOICE/DATA COMMUNICATIONS

MANUFACTURING TECHNOLOGIES, INC.
Matchmaker 2000

Manufacturing Technologies, Inc. has introduced a link enabling IBM 3270 terminal users to access non-IBM hosts, local-area networks and public data networks.

Matchmaker 2000 is said to allow users to toggle back and forth between IBM and non-IBM sessions. It reportedly allows access to minicomputers and mainframes such as those from Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co. and a variety of micros, private branch exchanges, public packet-switching networks, information services and electronic mail services.

The product is installed between the user's IBM 3178, 3179, 3180, 3278 or 3279 terminal and the IBM 3274 or 3276 cluster controller. The Ascii device can be connected directly with an RS-232C interface or through a modem, according to the vendor. It reportedly supports either 7- or 8-bit Ascii character modes at speeds up to 19.2K bit/sec.

It is based on an Intel Corp. control microprocessor with structured control programs and table-driven software for interface flexibility, according to Manufacturing Technologies.

Matchmaker 2000 costs $695.

Manufacturing Technologies, 6481 Global Drive, Cypress, Calif. 90630.

PROTOCOL CONVERTERS

THOMAS ENGINEERING CO.
Protocol Control Unit

Thomas Engineering Co. has announced an enhanced model of its MZ-80 MIU protocol converter.

The Protocol Control Unit reportedly gives asynchronous terminals access to IBM Bisynchronous and Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) nets, Honeywell, Inc. Visual Information Projection (VIP) nets and X.25 packet-switched nets.

It was designed to give a terminal access to all four environments and is said to support up to 50 asynchronous terminals and four hosts. The basic unit supports eight terminals.

The unit has a facility for file transfer, modem and printer sharing and access to dial-up modems and serial devices such as cash registers and energy management controllers, according to the vendor. The modular units with bisynchronous and VIP support will be available in January 1985, the SNA/SDLC support in the second quarter of 1985 and the X.25 support in the third quarter of 1985.

Prices start at $5,995 for the eight I/O port model. Host ports cost $750 each, except for SNA/SDLC, which costs $1,100.

Thomas Engineering, 2440 Stanwell Drive, Concord, Calif. 94520.

SOFTWARE

COMPUTIME, INC.
Communications software package

Computime, Inc. has announced a data collection and communications software product for use on IBM mainframes serving intelligent terminals such as retail point-of-sale and banking terminals.

The software, which is unnamed, is said to provide off-line polling of terminals to collect data for batch processing and to provide downloading of price changes and other information to the terminals.

The number of lines served is limited only by the host's physical limits. The product's modular design reportedly allows access to varied communications devices and use of various standard protocols.

It runs on IBM 4300 series, 370 series and 30 series mainframes under DOS/VSE and OS/MVS.

The basic version costs $65,000; additional modules that provide extra protocols and access to additional devices cost about $25,000 each.

Computime, 401 N. 117th St., Omaha, Neb. 68154.

MULTIPLEXERS/ MODEMS

ASTROCOM CORP.
SH56S

Astrocom Corp. has introduced its SH56S modem, designed to transmit synchronous data at 28K bit/sec or 56K bit/sec over twisted-pair lines.

At the lower speed, the SH56S is said to be effective over distances up to 3 miles and 2¼ miles at 56K bit/sec. It reportedly can be configured for point-to-point or multipoint operation, is available in a stand-alone or nested circuit card design, has switch-selectable speeds and features an optional V.25 interface.

With an RS-232 interface, the stand-alone costs $730, and the circuit card costs $540. With the V.25 interface, it costs $822 as a stand-alone and $632 as a circuit card.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55101.

MICOM SYSTEMS, INC.
Micro4000 Data Modem Model 40144

Micom Systems, Inc. has announced what it said is its fastest full-duplex, leased-line modem.

The Micro4000 Data Modem Model 40144 normally operates at 14.4K bit/sec, but is said to accelerate to 16.8K bit/sec in the absence of line noise.

This capability reportedly increases throughput, particularly on

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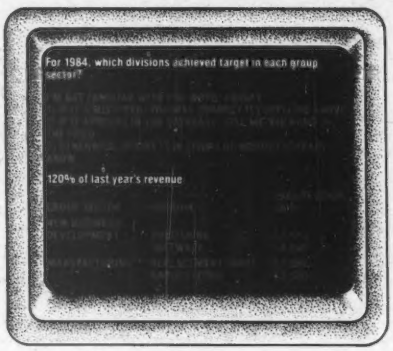

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links supporting multiplexers or remote job-entry stations. The increase from 14.4K bit/sec to 16.8K bit/sec is automatic under optimal line conditions, and the speed can fall back automatically to 12K bit/sec or 9.6K bit/sec if line quality deteriorates below AT&T D1 conditioning standards. The modem costs $6,495.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

U.S. ROBOTICS, INC.
Modems and software

Modem manufacturer U.S. Robotics, Inc. has introduced two 2,400 bit/sec modems, the stand-alone Courier 2400 and integral Microlink 2400 for use in the IBM Personal Computer and compatibles.

The units reportedly provide dial-up, asynchronous communications and feature autodial and autoanswer, CCITT V.22 compatibility at 2,400 bit/sec, and compatibility with AT&T 212A at 1,200 bit/sec and AT&T 103 at 300 bit/sec.

Other features include call duration reporting, display of current settings for communications parameters and other operational controls, Help screens, repeat command, quote mode and call progress detection.

Each modem costs $895.

The company also announced Telpac 3.0, an enhanced version of its telecommunications package for the IBM Personal Computer and compatibles designed to work with U.S. Robotics and compatible modems. The package features windows to guide users through commands and costs $99.

U.S. Robotics, 1123 W. Washington Blvd., Chicago, Ill. 60607.

NETWORK SERVICES

SATELLITE BROADCAST NETWORK, INC.
Satellite receiver system

Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users.

Users can purchase a 12-GHz compact satellite receive-only antenna, an amplifier, a solid-state receiver and a demodulator to access the service, which is available to users of the IBM Personal Computer and compatibles.

The company said that services will include financial data, news, weather, sports, software downloading and specialized information such as agricultural, scientific and medical data. The information services will be provided by various vendors.

The hardware for the 9.6K bit/sec service costs $950.

Satellite Broadcast Network, 30 E. Huron, Chicago, Ill. 60611.

AUXILIARY EQUIPMENT

LIGHTWAVE COMMUNICATIONS, INC.
FO-232E

Lightwave Communications, Inc. has announced the third product in its series of RS-232C fiber-optic data links.

The FO-232E was designed to transmit data asynchronously via plastic cable at distances up to 250 feet. It is intended to enable end users to interconnect terminals, printers and other peripherals to computer equipment at speeds up to 19.2K bit/sec and is compatible with existing RS-232C 25-pin connectors, according to the company.

It costs $90.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn. 06877.

KURZWEIL COMPUTER PRODUCTS, INC.
Penta Custom Interface

Kurzweil Computer Products, Inc. has announced a custom interface that is said to link its Kurzweil 4000 Intelligent Scanning systems and Penta Systems International, Inc.'s typesetting systems.

The Penta Custom Interface is said to insert Penta-specified composition commands automatically into the scanned text during the communications process from the Kurzweil 4000 to a Penta front-end system. It was designed to eliminate the need for inserting additional typesetting commands prior to phototypesetting.

Available now on 8-in. floppy disks, it costs $5,500.

Kurzweil Computer Products, 185 Albany St., Cambridge, Mass. 02139.

DIGITAL EQUIPMENT CORP.
DHU11; DMZ32

Digital Equipment Corp. has introduced two asynchronous multiplexers to connect serial lines to DEC Unibus-based VAX-11 and PDP-11 computers.

According to the vendor, the DHU11 interfaces up to 16 asynchronous lines between any PDP-11 or VAX-11 computers with an integral Unibus operating under DEC VAX/VMS Version 4.0. The single hex-size circuit card is said to support medium- and high-speed serial communications requirements, connecting through RS-232C or RS-432A interfaces. It features direct

Continued on page 42

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fits of working with FOCUS. It's new INTELLECT/FOCUS.

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If you'd like, we'll send you a free demo diskette so you can get a look at new INTELLECT/SX and INTELLECT/ FOCUS. But be sure to order new INTELLECT/SX or new INTELLECT/FOCUS before December 31, 1984 so you can get the special introductory price of $30,000. In plain English, it could be the smartest move you've made all year.

•FOCUS is a product of Information Builders, Inc.

INTELLECT/SX and INTELLECT/FOCUS run on IBM and IBM-compatible mainframes.

ARTIFICIAL INTELLIGENCE CORPORATION
100 Fifth Avenue, Waltham, MA 02254 617-890-8400

Continued from page 41

memory access (DMA) and first-in-first-out (Fifo) operations to minimize CPU overhead, according to DEC.

The DMZ32 multiplexer supports up to 24 asynchronous lines to Unibus-based VAX-11 computers. The vendor said the DMZ32 is a high-performance unit that can interface a variety of terminals to a VAX-11 system, allowing a terminal distribution panel to be located up to 5,000 feet from the Unibus connection. It also features RS-232C connectors and DMA and Fifo operation.

Both controllers provide half- or full-duplex communications, according to DEC.

The price of the DHU11 begins at $3,120, and the price of the DMZ32 begins at $3,215.

DEC, Maynard, Mass. 01754.

DIGITAL PRODUCTS, INC.
Digital Current Loop Switches

Digital Products, Inc. has announced a series of switches that allow Teletype and compatible equipment to communicate with any RS-232 device.

Digital Current Loop Switches reportedly allow Teletypes, early Digital Equipment Corp. equipment such as PDP-11 computers and LA 120 terminals, high-speed printing terminals and CRTs to be combined with computers and modems in a common system.

They are said to accommodate up to 9,600 bit/sec transmissions and to allow grouping to connect an unlimited number of devices.

They are priced from $395.

Digital Products, 600 Pleasant St., Watertown, Mass. 02172.

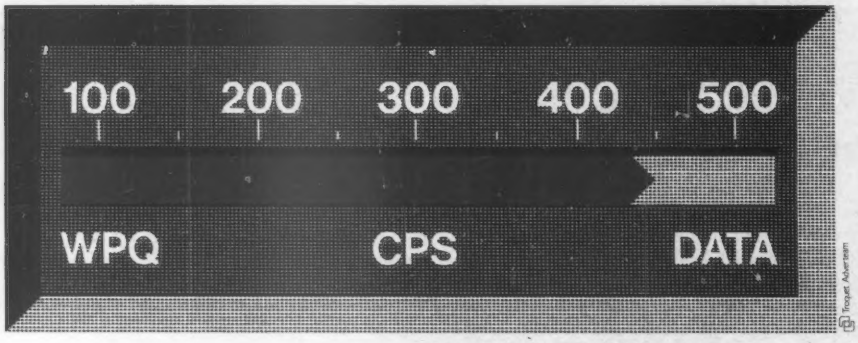
ALCYON CORP.
I/O processor

Alcyon Corp. has announced an intelligent I/O processor designed for Motorola, Inc. 68000 and AT&T Unix-based systems.

Each of the 16 full-duplex asynchronous serial data channels of the device can support data bursts up to 9.6K bit/sec from a 68000 processor. Synchronous data rates up to 1.5M bit/sec are possible on each of two programmable, on-board full-duplex channels. It includes a four-channel direct-memory access controller and buffer memory and occupies a dual-width Digital Equipment Corp. Q-bus circuit board. It costs $2,345. An eight-channel option costs $950 and a 16-channel multiplexer is $1,555.

Alcyon, 8716 Production Ave., San Diego, Calif. 92121.

Our multi-mode printers accelerate from 100 cps to 480 cps and have an impressive finish everytime.



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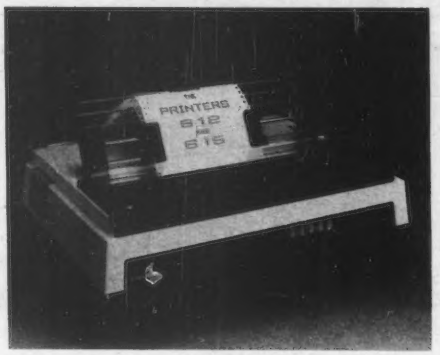

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MAIL from page 39

"Our new interface eliminates these problems. It establishes and terminates the connection automatically between our network and the MCI Mail network. Their system then takes care of the other end. And we get an acknowledgement — when the message is received by the MCI Mail network as well as when it's delivered in hard-copy form to the recipient," Tunis said.

The interface also permits a delivery confirmation to be returned to the sender from any terminal connected to the MCI Mail network.

Tunis said it is still too early to detect a change in the outside message traffic flowing through Lincoln National's in-house network, largely because the company hasn't made a special effort to tell users about the interface.

The present version is being upgraded to conform with the version MCI announced this week. Tunis expects the upgrade to become operational within a few months. He believes that during the succeeding year or two, outside message traffic sent and delivered through the company's electronic mail network will increase gradually.

A prospective added benefit, Tunis said, is the ability to correspond with clients and suppliers on-line. Lincoln National communicates regularly, for example, with reinsurance companies that broker the company's policies and with organizations that have purchased group insurance coverage. Now, the postal service carries this correspondence.

A systems analyst and a programmer needed about two man-months to develop the present interface, Tunis said, and he estimates that implementing the upgrade will require approximately one more month. The only other cost — amounting to about $600 — was for an error-checking modem to connect Lincoln National's in-house network with the MCI Mail network.

CIRCUIT from page 39

expected to be upright about T1 use, but a spokesman for the Federal Communications Commission admitted that there will be "definite problems" monitoring its use.

These problems will be exacerbated as T1 use becomes more prevalent. The appeal is usually a simple, economic one. As an example, a user that wished to remain anonymous reported that he is saving more than $5,000/mo by replacing individual leased lines with a single T1 facility.

He replaced 20 tie lines connecting two PBXs and 11 individual 9.6K bit/sec leased lines for data communications with the T1 link. With a T1 multiplexer, the 1.54M bit/sec bandwidth of the T1 facility was divided into 20 32K bit/sec voice tie lines, one 19.2K bit/sec data channel, 10 9.6K bit/sec synchronous channels and four 9.6K bit/sec asychronous channels. Additionally, the user reported there is approximately 700K bit/sec of spare capacity on the link.

Before the T1 was cut over, the total cost of this user's voice and data lines, plus the necessary modem and multiplexing hardware, was nearly $9,500/mo. With the T1 link and the necessary multiplexing hardware his monthly bills dropped to roughly $3,800/mo.

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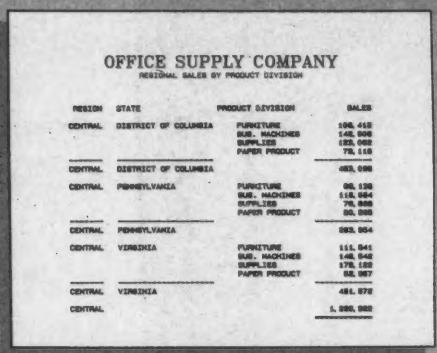

OFFICE SUPPLY COMPANY
REGIONAL SALES BY PRODUCT DIVISION

REGION	STATE	PRODUCT DIVISION	SALES
CENTRAL	DISTRICT OF COLUMBIA	FURNITURE	106,412
		BUS. MACHINES	142,506
		SUPPLIES	123,062
		PAPER PRODUCT	75,118
CENTRAL	DISTRICT OF COLUMBIA		453,098
CENTRAL	PENNSYLVANIA	FURNITURE	86,138
		BUS. MACHINES	118,584
		SUPPLIES	76,828
		PAPER PRODUCT	80,808
CENTRAL	PENNSYLVANIA		283,954
CENTRAL	VIRGINIA	FURNITURE	111,841
		BUS. MACHINES	148,542
		SUPPLIES	178,122
		PAPER PRODUCT	52,867
CENTRAL	VIRGINIA		491,372
CENTRAL			1,288,982

Take a quick look at sales by state.

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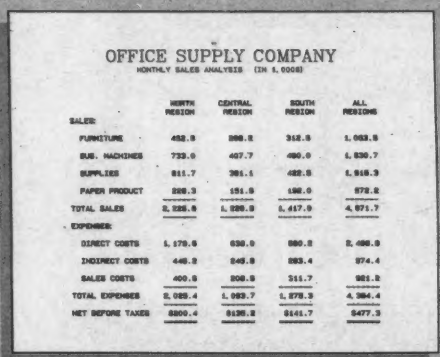

OFFICE SUPPLY COMPANY
MONTHLY SALES ANALYSIS (IN 1,000$)

	NORTH REGION	CENTRAL REGION	SOUTH REGION	ALL REGIONS
SALES:				
FURNITURE	452.5	288.2	312.5	1,053.5
BUS. MACHINES	733.0	407.7	490.0	1,630.7
SUPPLIES	811.7	381.1	422.5	1,615.3
PAPER PRODUCT	228.3	151.5	192.0	572.2
TOTAL SALES	2,225.6	1,228.5	1,417.0	4,871.7
EXPENSES:				
DIRECT COSTS	1,175.6	638.0	580.2	2,486.8
INDIRECT COSTS	448.2	245.8	283.4	974.4
SALES COSTS	400.5	208.5	311.7	921.2
TOTAL EXPENSES	2,025.4	1,093.7	1,275.3	4,384.4
NET BEFORE TAXES	$200.4	$135.2	$141.7	$477.3

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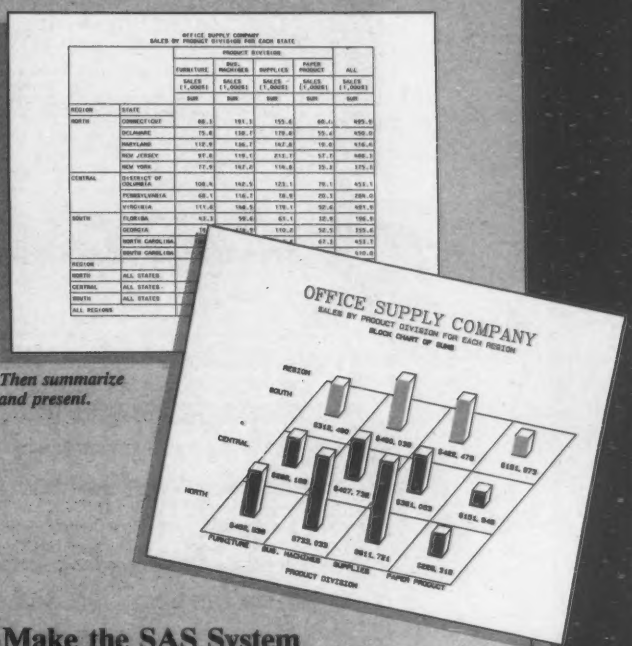

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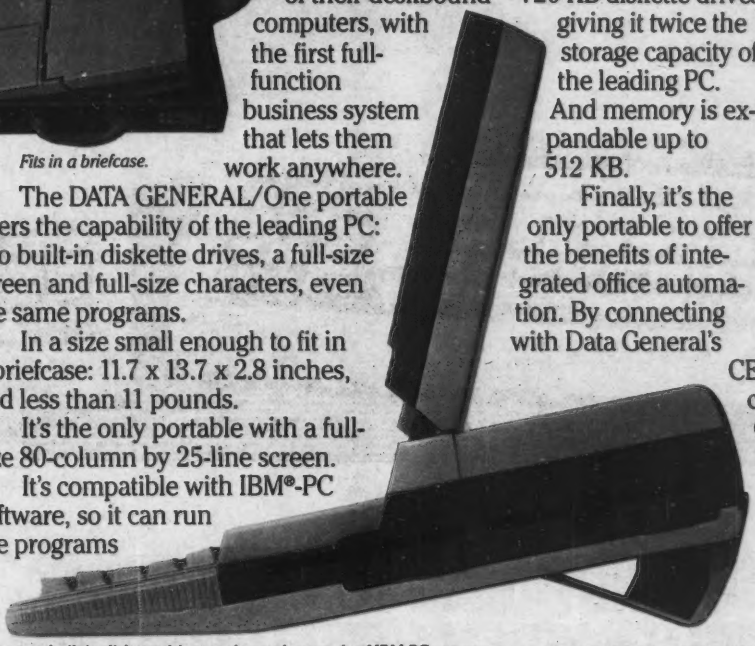

It has two built-in diskette drives and runs thousands of IBM-PC programs.

available to PC users. Software like 1-2-3™ and Symphony™ from Lotus™, Wordstar®, dBase II®, Multiplan®, even engineering packages like Golden Common LISP™, and Bellesoft ES/P™-Ada®.

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HARD TALK
John Desmond
CW Staff

Can DEC software offerings live up to 8600's promise?

By announcing its most powerful CPU, the VAX 8600, Digital Equipment Corp. has caught up in hardware technology to competing supermini vendors Prime Computer, Inc. and Data General Corp. and even positioned itself well against small IBM mainframes in price/performance terms.

But several analysts interviewed by *Computerworld* question whether DEC's software can equal the power of its hardware.

Prime's 9950 and DG's MV/10000 high-end machines, each boasting performance ratings of 2.5 million instructions per second (Mips) [CW, Aug. 20] are more powerful than the machine that was formerly DEC's biggest box, the VAX-11/782, which has a Mips rating of 1.2. But the 8600 comes in with a Mips rating estimated at 4.4, just below IBM's recently announced 4381 Model Group 3.

"DEC has regained the leadership position it needed to maintain credibility in the industry," said Hank Janson of International Data Corp. (IDC), a market research and consulting firm based in Framingham, Mass. IDC analyst Dave Moschella said, "This system allows DEC to meet the demands of customers who may have been attracted to IBM," at a price considerably less than comparable IBM mainframes.

Frederic Withington, vice-president of information systems for Arthur D. Little, Inc. of Cambridge, Mass., said, "The 8600 makes a major change in DEC's competitive position. There is an outside chance DEC may get into [the manufacturing] machine rooms of large companies that are now primarily IBM." But, he qualified, "The 8600 hardware is good for this, but I'm not sure the software is powerful enough. The big, heavy-duty system programs like CICS I'm not sure DEC can match. Without them, DEC can't play."

Stephen Smith, security analyst with Paine Webber, Inc., does not believe the 8600 will allow penetration of IBM's market so much as it will make DEC more attractive to new users and existing users who may have been contemplating switching to IBM for more power. "I think the top-cover is significant," Smith said. "In the past, when the end user felt he needed a bigger machine, the only way to go was IBM because DEC offered less than 2 Mips. Now, [DEC] can offer their customers a greater range of performance. So I do think it helps their position in relation to IBM, but I don't think it's an attack on the IBM data center."

Like Withington, Smith said, "The real issue is software development." Smith likes version 4.0 of VMS for its clustering

See **DEC** page 52

Amdahl enhances 6880

Doubles channel, memory capacity; lowers fees

SUNNYVALE, Calif. — Amdahl Corp. last week doubled the channel and cache memory capacity of its 6880 disk control unit. At the same time, Amdahl cut the purchase price of the cache memory feature by as much as 52%. The company also lowered maintenance charges on all models of the 6880 by 20% to 25%.

The cache controller feature is used to boost CPU performance by storing frequently used data in cache memory, the company said. The 6880 is now available with 8M-, 16M-, 24M- or 32M bytes of cache memory. Previously, the maximum cache capacity was 16M bytes. A spokeswoman said the expanded memory will be accomplished with 256K-bit memory chips.

The 6880 can now support up to 16 channels, twice the previously available capacity. The spokeswoman noted that Amdahl has also added to the 6880 support for IBM's VM operating system using IBM's High Performance Option.

Purchase prices for the 6880 range from $119,970 to $315,480, depending on the memory configuration. Corresponding maintenance charges now range from $684/mo to $1,004/mo, according to the firm.

A sample configuration consisting of a 6880 G2 controller with 16M bytes of cache memory, one Amdahl 6380 AA4 string controller and three 6380 B4 disk drives costs $294,600. The same configuration used to cost $427,500; a spokeswoman noted that the lower price also reflects an earlier price cut on disk drives. Maintenance on the configuration costs $1,730/mo; the old maintenance price was $2,280/mo.

As an example of the cost of cache memory field upgrades, Amdahl said a user of a 6880 with a 16M-byte cache controller feature would have to pay $40,000 to upgrade the unit to accommodate 24M bytes of cache memory. Likewise, it would cost $80,000 to upgrade a 6880 with a 16M-byte cache controller feature to a 32M-byte configuration.

Amdahl is located at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

Honeywell announces mini-based hospital record management tool

MINNEAPOLIS — Honeywell, Inc. has announced a medical record management system for hospitals, the Transcription Recording and Chart Tracking System (Tracts), running on the company's DPS 6 line of minicomputers.

The system runs under the company's Gcos 6 MOD 400 software.

The system's medical record software is said to automate transcription, record analysis, record tracking, abstract production and report generation. The company's office automation software includes word/document processing, records processing, calendar and calculator facilities. DP options for Tracts include data base management systems, transaction processing packages and high-level language support. Communications software is available to support the exchange of data between Tracts and hospital billing, statistical and admissions computers, the company said.

The price of a 250-bed hospital configuration including DPS 6/45, four workstations, a printer, 1M byte of memory and two 20M-byte disk drives is $62,000.

More information is available from Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

Sytek releases PFX micro security system

MOUNTAIN VIEW, Calif. — Sytek, Inc.'s Data Security Division recently announced the PFX identity authentication system, a security system that uses an automated one-time password technology said to prevent unauthorized access to networked personal computers or multiuser systems.

Sytek said the PFX system includes a Passport, a portable, hand-held device with an LCD that is programmed for each individual user, and an Authentication Server, a Convergent Technologies, Inc. microcomputer that attaches to the host computer or network.

Under the PFX system, users enter a unique numerical password each time they wish to access the system, the firm said. In order to gain entry, the user must have a Passport, a personal identification number (PIN) and an Authentication Server and must respond correctly to a series of prompts.

'Challenge number'

When a user logs on to the system, the Authentication Server issues a seven-digit "challenge number," which appears on the user's computer screen, according to the company. The user enters his own PIN into the Passport and then enters the challenge number as well.

A one-time password (another seven-digit number) appears on the LCD on his Passport. To gain access to the system, the user then types the password into the terminal.

According to the company, the password sequence generated by each Passport is unique: Given the same challenge number, no two Passports will generate the same response.

In addition, no individual Passport responding to the Authentication Server's challenge will give the same response twice, the company said. An individual Passport is said to work only with the PIN for which it has been programmed, the firm said.

A single Authentication Server is said to be able to serve one or two host computers and up to 2,000 users. The PFX system, said to be compatible with most computer equipment, links to systems through one or more RS-232 serial ports.

The Passport is said to give users access from any terminal. According to the company, the device is virtually tamperproof because its microprocessor will erase itself if the device is taken apart.

The system's Authentication Server is said to

See **SYTEK** page 54

■ NCR Corp. has released the 9100/System hardware and software for retail stores/**48**

■ Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using Wang Laboratories, Inc. CPUs/**48**

INSIDE

Turnkey Systems/**48**
Terminals/**52**
Printers/Plotters/**54**

TURNKEY SYSTEMS

REDSHAW, INC.
Series/2

Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using a version of the Wang Laboratories, Inc. 2200 MVS CPU with 600-nsec processing speed and support for up to 240 Wang 2236 workstations or Professional Computers.

Storage capacity of the Series/2 exceeds 320M bytes or 250,000 policy files, the company said. Financial analysis, policy file management, word processing and a variety of personal computer software is available, including IBM Personal Computer-compatible types. The Redshaw P-400 printer, said to print over 400 line/min of letter-quality type, is also provided with the system.

The price for a system with the Wang 2200 and eight workstations is about $88,000, the vendor said.

Redshaw, 103 Yost Blvd., Pittsburgh, Pa. 15221.

DATA STORAGE

METHEUS-COMPUTERVISION, INC.
MS200 mass storage system

Metheus-Computervision, Inc. has released a mass storage system that provides up to 840M bytes of additional storage space formatted for Metheus-Computervision Design Systems. The MS200 has an average access time of 18 msec and a data transfer rate of 1.86M byte/sec.

The system offers a choice of either one or two 420M-byte Winchester disk drives or one Winchester drive and one Cipher Data Products, Inc. magnetic tape drive. It is fully field-upgradable, according to the vendor.

The price of the MS200 is $27,500 with one 420M-byte disk drive, and with the addition of one Cipher tape drive, it costs $35,500, the vendor said.

Metheus-Computervision, P.O. Box 959, Hillsboro, Ore. 97123.

MICRO TECHNOLOGY, INC.
MD4000 series subsystems

Micro Technology, Inc. has introduced three products in its new MD4000 series of subsystems. The products are designed for use with Digital Equipment Corp.'s LSI-11, LSI-11/2, LSI-11/23 and LSI-11/73 computers running under DEC's RT-11 and RSX-11M operating systems and using S&H Computer Systems, Inc.'s TSX-Plus time-sharing software.

The MD4260 consists of a 40M-byte fixed Winchester drive and a 60M-byte streaming cartridge tape and is designed for speed and reliability on backup capability, the vendor said.

The MD4910 is a 5¼-in. form factor removable Winchester subsystem. It consists of dual 10M-byte removable cartridges and is said to lend itself to sensitive or classified applications.

The MD4110 consists of a 40M-byte fixed Winchester drive and a 10M-byte removable media Winchester device and lends itself to on-site backup, software upgrades and installation of new software, according to the vendor.

The price of the MD4260 is $7,156, the MD4910 is $5,679, and the MD4110 is $6,370.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.

NCR offers 9100/System, POS units for retail use

DAYTON, Ohio — NCR Corp. has announced the 9100/System hardware and software for general merchandise retail operations and two point-of-sale terminals for the specialty store marketplace.

The 9100/System is said to use very large-scale integration technology and communications technology that allows files resident at local sites to be accessed by remote central computers. The architecture provides on-line transaction processing, automatic price lookup, efficient inventory control and automatic credit authorization.

The system uses the company's standard computer system interface, an Ansi standard peripheral interface protocol. The 9100 features up to 1M byte of memory, a 5¼-in. flexible disk, two 5¼-in. Winchester disk drives, up to 37M bytes of storage and the standard computer system interface controller. The desk unit measures 10-in. wide by 27-in. deep by 29-in. high.

The 9100/System uses IBM's Systems Network Architecture for data communications. The company's Tcos operating system is intended for maximum efficiency in a distributed transaction processing environment.

Tcos has a series of subsystems, including a Cobol interface, a function scheduler and a file management system.

The price of the 9100/System hardware is $23,000, and the price of the software is $8,000, the company said.

The 2155 terminal can function as a stand-alone or primary terminal controlling 2154 satellite terminals in a cluster. The 2154 is intended to function as a secondary terminal. Both terminals are programmable in Basic, the company said.

The 2155 and 2154 terminals in a cluster environment operate on a shared resource basis. The 2155 has a programmable 50-key, point-of-sale function keyboard, 170 line/min printer, cash drawer and operator display, the vendor said. A 5¼-in. floppy disk drive, expandable to dual flexible disk drives, is included with the terminals. Standard memory is 128K bytes, expandable to 256K bytes.

Three communications adapters available include asynchronous, common carrier Data Link Control and common carrier bisynchronous for communicating with the host processor. The price of the 2154 is $3,310, and prices for the 2155 start at $4,405, according to the vendor.

Additional information is available from NCR, which is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

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Q. CAN A CABLING SYSTEM UNTANGLE TELECOMMUNICATIONS?

A. With all the various devices a company uses to process, move and store information, it's easy to lose sight of one important element—the need to connect all these devices together. That's where a uniform, structured cabling system fits in. But are you just substituting one set of wires for another? Here are some questions and answers that might help you better understand the role a cabling system can play both in solving your communications problems today and in protecting your telecommunications investment for tomorrow.

Q. First of all, just what is a cabling system?

A. A cabling system is designed on a "wire-once" concept. Just as electrical wires are run in buildings today, a cabling system is a permanently installed set of wires that connects the computers, terminals, workstations, telephones and PBXs within a large office building or a campus. This cabling system should also be the foundation for local area networks of the future.

Q. Aren't my computers and telephones already hooked up to a cabling system?

A. It's not so much a cabling system as it is a bunch of cables. Look above the drop ceilings in most office buildings, and you'll discover miles and miles of all kinds of cable. And much of it, strangely enough, is unused. The reason for this waste is that few devices (i.e., telephone, terminal, personal computer, etc.) use the same type of cable. Consequently, when a new device is installed or when one is moved from one office to another, it's quicker, easier and cheaper to run a new cable than it is to remove and reroute the old cable.

This is not to suggest, however, that running a new cable is quick, easy or inexpensive. Relocating just one terminal can cost as much as $1,500. Not to mention a week or two of downtime while the wiring gets done. And when you think about how often office workers move from one workplace to another, you can see that we're talking about a considerable expense.

Q. How can a cabling system help solve my wiring problem?

A. Once installed, a cabling system can make wiring for a new or relocated terminal as easy as moving a plug from one socket to another. The IBM Cabling System calls for the one-time installation of a single cable running from each workplace, inside the walls, and into a central "wiring closet." In the office, that cable terminates in a standard faceplate on the wall, not unlike an electrical outlet. In the wiring closet, the cable terminates in a patch panel that can connect it to any number of devices.

The installation of the IBM Cabling System should be considered if you're adding a number of new workstations, installing a PBX, doing a major renovation or building a new office building. In many cases the "wire-once" benefit will cost-justify the IBM Cabling System in five years.

Q. How do the telephone and the IBM Cabling System work together?

A. The IBM Cabling System can be used for data only, or for both data and voice. When the voice capability is used, the voice wires are separated from the single cable in the wiring closet and run to a telephone switching system. Several major PBX manufacturers have tested their PBXs and telephones with the IBM Cabling System. They report that the voice wires fully support their PBX features and transmission speeds.

Q. How can the IBM Cabling System help me today?

A. Currently being installed in office buildings, the IBM Cabling System can connect most of the available IBM data devices, such as personal computers and workstations, small and intermediate computers. We expect that it will also connect many devices made by other manufacturers.

Q. How will the Cabling System help answer my telecommunications needs of the future?

A. The quality and reliability of the IBM Cabling System enable it to transmit data at very high speeds. This makes it the ideal foundation for IBM's planned general purpose local area network (LAN). This LAN, utilizing a "token-ring" technology, can be implemented gradually to connect different workstations, departmental systems and large processors. So by investing in the IBM Cabling System today, you'll not only save money on current installation and rewiring costs, you'll also be better prepared to meet your telecommunications needs of the future.

Q. How do I go about getting the IBM Cabling System?

A. There are a number of design and installation companies that can plan your cabling system and do the actual wiring. The cable and accessories are available through authorized distributors. Your IBM marketing representative can provide you with the names of these companies. The cable and accessories can also be ordered directly from IBM.

Q. Where do I go from here?

A. Installing the IBM Cabling System today is really installing the foundation for your company's future in telecommunications. So you'll want to plan quite thoughtfully. We can help. If you'd like a free copy of the brochure, "The IBM Cabling System," call 1 800 IBM-2468, Ext. 90, or return the coupon.

IBM

IBM
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400 Parson's Pond Drive
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☐ Please have an IBM marketing representative call me.
☐ Please send me "The IBM Cabling System" brochure.

Name_____ Title_____
Company_____
Address_____
City_____ State_____ Zip_____
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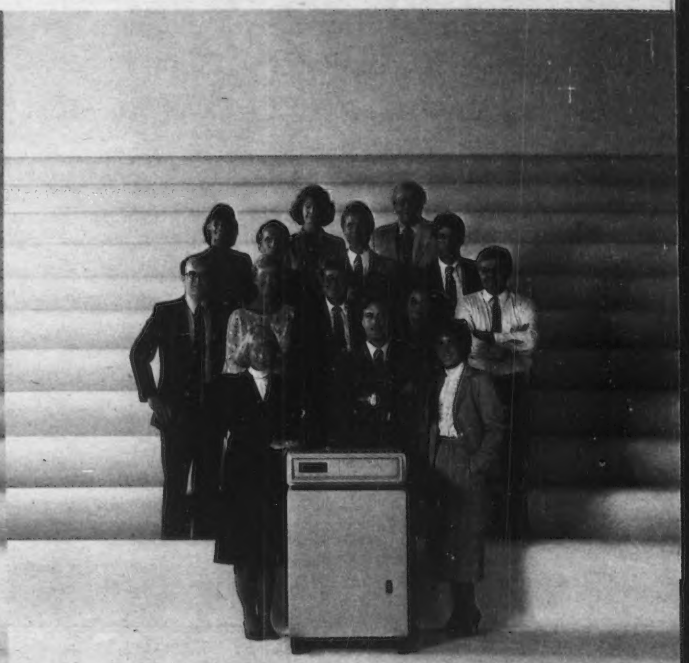
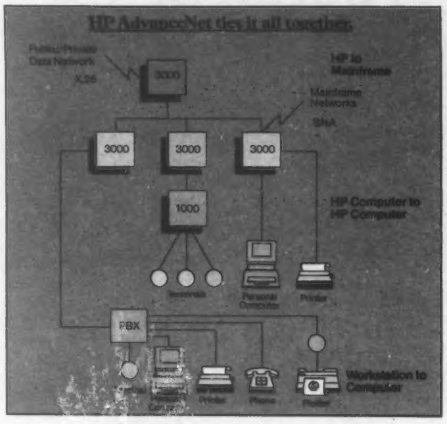
11-15



The HP 3000 compu

However much you change, you're going to need both office automation *and* distributed data processing. Fortunately, one company gives you both in a single system.

Hewlett-Packard's HP 3000 is a fully compatible family of computers, ranging from a new system that handles as few as two users to a distributed mainframe that connects up to 400. You can run the same software right up the line.



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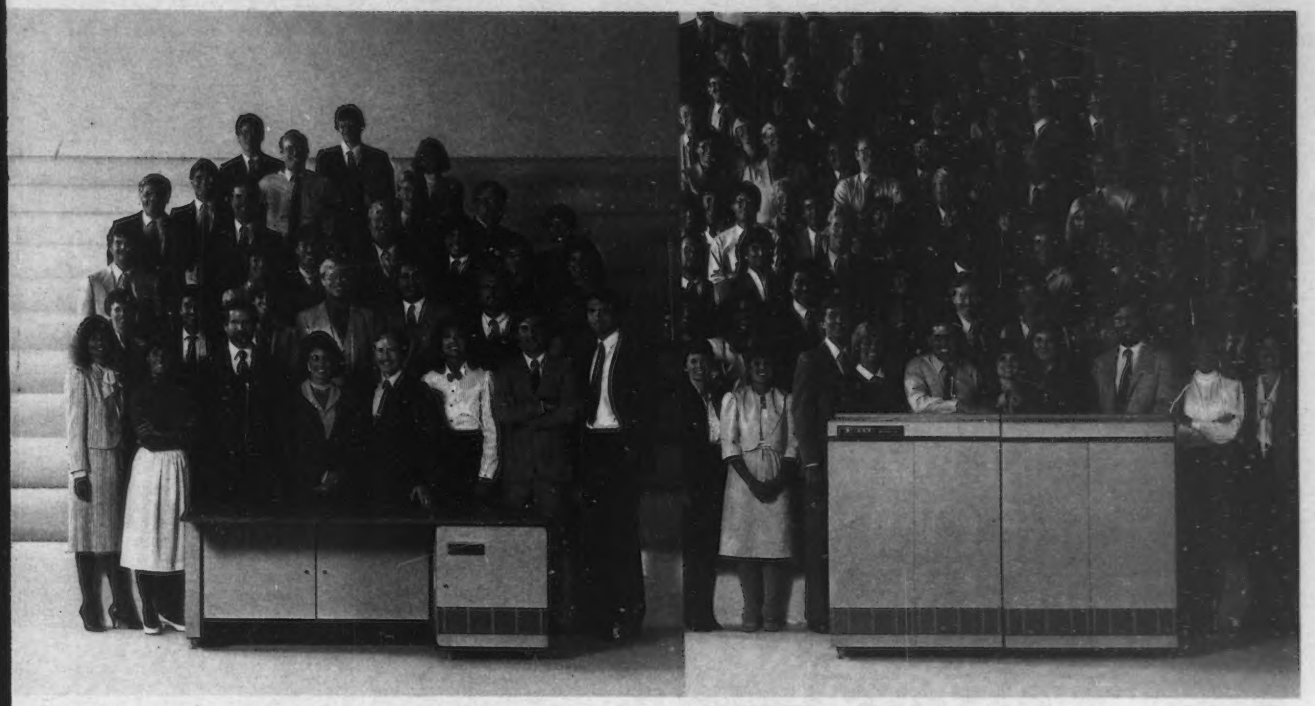

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TERMINALS

ANN ARBOR TERMINALS, INC.
Ambassador XL; Guru XL

Ann Arbor Terminals, Inc. has introduced two vertical format 15-in. display terminals. The units were designed for word processing applications and are part of the company's XL series of Ansi standard CRT display terminals.

The Ambassador XL features a 4,800-char. memory that can be positioned on the screen in a 60-line by 80-col. format and scrolled or vertically zoomed through in other user-defined display formats ranging from 18 to 60 lines, the vendor said. This editing terminal can operate in both interactive and block modes at data rates up to 19.2K bit/sec.

The Guru XL has a 28K-byte memory that can be configured in formats of up to 66 lines by 170 columns. The off-screen memory can be partitioned into pages of text or scrolled through horizontally and vertically to accommodate large files of data, according to the vendor. Set-up modes allow for black characters on a white background and adjustment of screen brightness levels.

The keyboard used on both units is programmable with any Ascii string on up to 30 levels. Keys can be tagged for local only, send only and repeat control.

Price of the Ambassador XL is $1,595 and for the Guru XL is $2,395.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

INTECOLOR CORP.
Model 8810, 3810 terminals; Series 2000 monitors

Intecolor Corp. has introduced the Model 8810 and 3810 color terminals, compatible with the company's 8001G terminal, and the Series 2000 19-in. monitors.

The Model 8810 features 32K bytes of random-access memory, three serial I/O ports and one parallel port and support for up to seven character sets of 128 characters each, according to the vendor.

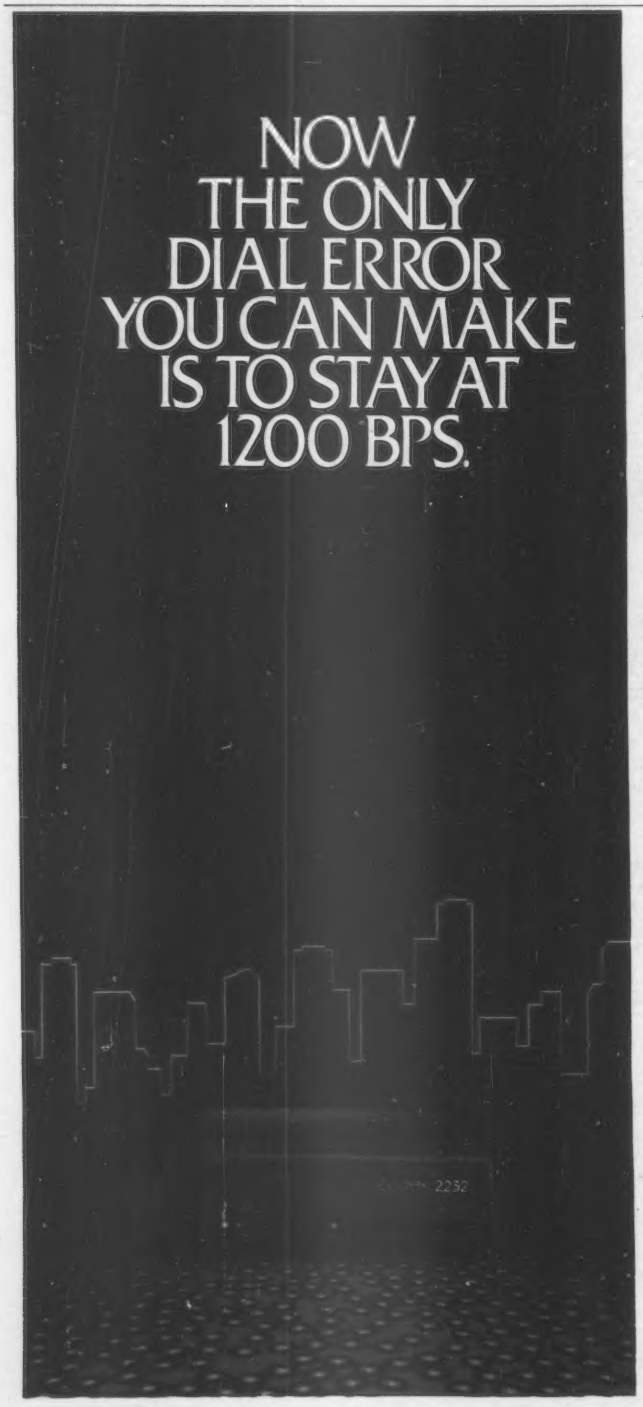
The Model 3810 color terminal, a smaller version of the 8810, features a 13-in. display, tilt screen and detached keyboard and a display format of 80 lines by 48 characters, the vendor said. A rack-mounted version of the 3810, the Model 3881, is also available.

The Series 2000 monitors are intended for personal computer-based control applications and are available for Texas Instruments, Inc.'s Professional, IBM's Personal Computer and compatibles.

The Model 8810 color terminal costs $3,145; the Model 3810 costs $2,645; and the Model 3881 costs $2,995, the vendor said. The price for a Series 2000 monitor is $1,595.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

See **UNITS** page 54



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codex
MOTOROLA INC.
Information Systems Group

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DEC from page 47

ability, distributed file management and software development features. "It's a very sophisticated operating system. It's a strong alternative to [AT&T's] Unix," he said.

Clay Prestia, vice-president of technical development for Raxco, Inc. of Rockville, Md., which provides analysis and performance aids for VAX VMS systems, characterized the 8600 as having a mainframe-like architecture that is distinguished from the VAX-11/780 supermini architecture by the 8600's separate memory-to-CPU and I/O transfer buses. "The big slowdown with the previous architecture in the 780 was the big slowdown in the memory path," Prestia said. "Anytime the I/O is happening, the CPU has to wait for the memory path to clear. That doesn't happen in the 8600."

But while DEC would like to compete with IBM with the 8600, Prestia said, "Where DEC shoots themselves in the foot . . . is [in] the efficiency of the I/O handling in their software. DEC will have a hard time making a big dent into traditional DP areas until they do something about the efficiency of the software."

The analysts agreed that the 8600 announcement puts no immediate pressure on competing supermini vendors to match performance, since the 8600 is a catch-up product. But since the biggest box is often thought to be the easiest to sell, firms like DG and Prime are likely to respond eventually.

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CW 1119

SYSTEMS & PERIPHERALS

UNITS from page 52

ZENTEC CORP.
Zephyr DD-220

Zentec Corp. has introduced an alphanumeric terminal designed to be compatible with the Digital Equipment Corp. VT220 terminal.

The Zephyr DD-220 is said to emulate fully the VT220 and to feature a 14-in., lockable tilt-and-swivel monitor. It has a 105-key, detached, low-profile keyboard with an 18-key accounting-style pad. Fifteen of the 20 function keys are programmable, the vendor said.

Available character fonts include Ascii, the U.K. national set, DEC special graphics, multinational characters and a downloadable soft character font. The 25-line display can be 80 or 132 columns with bidirectional scrolling. Green or amber phosphor displays are available. The terminal also features blinking, bold, underline, normal or reverse video and double-high, double-wide and blank attributes on a character-by-character basis, the vendor said.

The Zephyr DD-220 costs $850.

Zentec, 2400 Walsh Ave., Santa Clara, Calif. 95050.

TERM-TRONICS, INC.
Miracle 178P

Term-Tronics, Inc. has announced the Miracle 178P, an IBM 3178-compatible terminal said to be equipped with a printer port that can be used to make an Ascii printer operate like an IBM 3287-type asynchronous printer.

The terminal features a 12-in. CRT, a 1,920-char. green phosphor screen, a tilt-and-swivel base, operator-adjustable screen contrast and brightness and an RS-232C printer port, the vendor said.

The Miracle 178P is priced at $1,145.

Term-Tronics, 7408 Trade St., San Diego, Calif. 92121.

MOTOROLA, INC.
KDT 480 Mobile Data Terminal

Motorola, Inc.'s Communications Sector has announced the KDT 480 Mobile Data Terminal, a wireless data terminal that can act as a stand-alone unit or be connected to a vehicle's radio.

The terminal can be connected to a fixed-position radio that transmits to and receives from a mobile radio, sending information back to a controller that acts as a telephone modem, the vendor said. The microprocessor-driven controller reportedly can communicate with IBM's Systems Network Architecture as well as binary synchronous and asynchronous protocols.

Features reportedly include random-access memory storage of up to 3,000 char., a text area of more than 20 sq in. and 12 lines of 40 char. in each format.

The terminal is priced at $3,295.

Motorola, Communications Sector, 1301 E. Algonquin Road, Schaumburg, Ill. 60196.

PRINTERS/PLOTTERS

GENERAL BUSINESS TECHNOLOGY, INC.
6630XP

General Business Technology, Inc. has announced the 6630XP laser printer for use with IBM's System/34, 36 and 38 processors, as well as with IBM's Personal Computer.

According to the vendor, the 6630XP produces up to eight pages of letter-quality type per minute. Two type styles are built-in, and additional font cartridges are available.

The printer interfaces with IBM systems via standard twin-axial cable. For remote applications, the printer may be connected through an IBM 5251-12 or 5294, the vendor said. The 6630XP is priced at $5,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

GOULD, INC.
Colorwriter 6120

Gould, Inc.'s Recording Systems Division, has announced the Colorwriter 6120, a seven-pen, general purpose plotter for business, scientific and engineering graphics.

The Colorwriter 6120, with RS-232C or Centronics Data Computer Corp.-type interfaces, is said to be compatible with Lotus Development Corp.'s 1-2-3 and Symphony, Sorcim Corp.'s Supercalc 3, Ashton-Tate's Framework, Decision Resources, Inc.'s Chartmaster and Signmaster and Graphic Communication, Inc.'s Graphwriter.

Features include paper size selection, front panel pause, reset and scale controls, a 7 in./sec plotting speed and .002 in. resolution. Prices begin at $895.

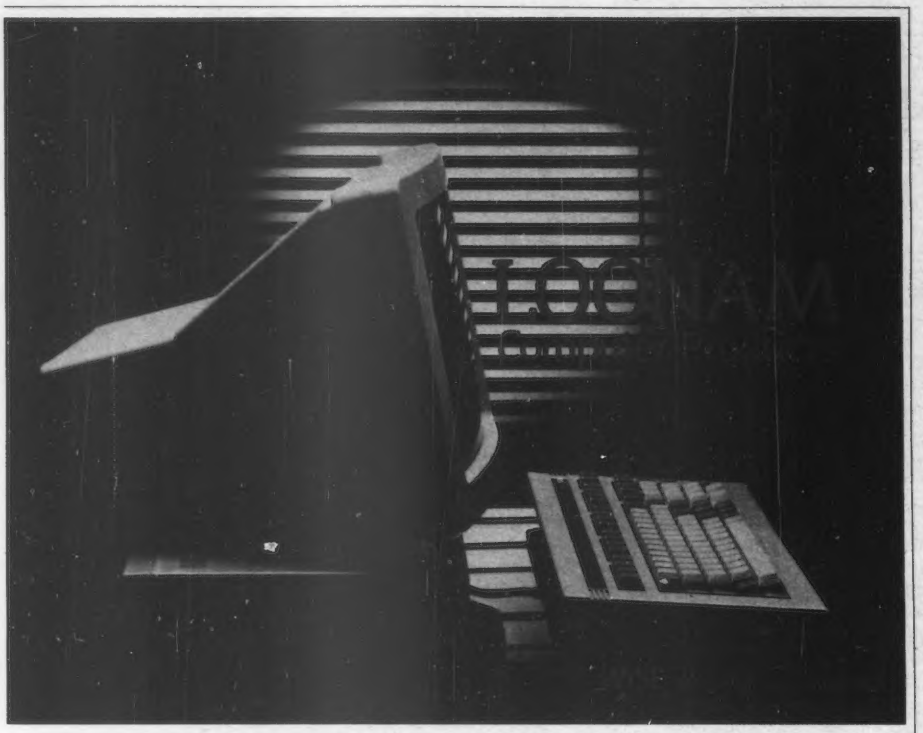
Gould, Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114.

SYTEK from page 47

store a list of authorized users and certain characteristics about each user in its memory. The Authentication Server is also said to maintain a record of user logon attempts in memory.

Sytek said the system will be available in mid-January. The price for one Authentication Server and 50 Passports will be $31,000. An additional server would cost $25,000, while another 100 Passports would cost about $8,000.

Additional information is available from Sytek, Data Security Division, which is located at 1225 Charleston Road, Mountain View, Calif. 94043.



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The WY-75 is fully software-compatible with the DEC VT-100 so it will operate with the majority of DEC or UNIX-based software systems.

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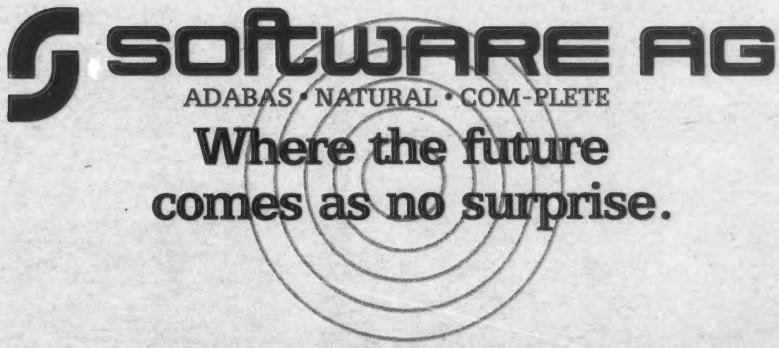

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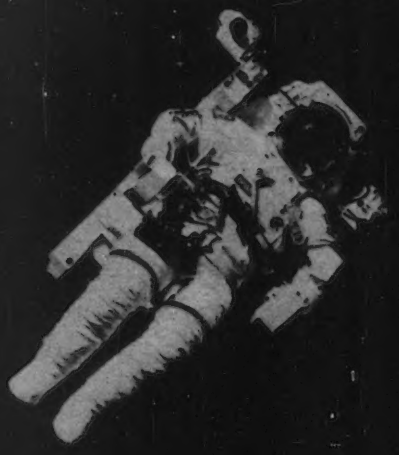

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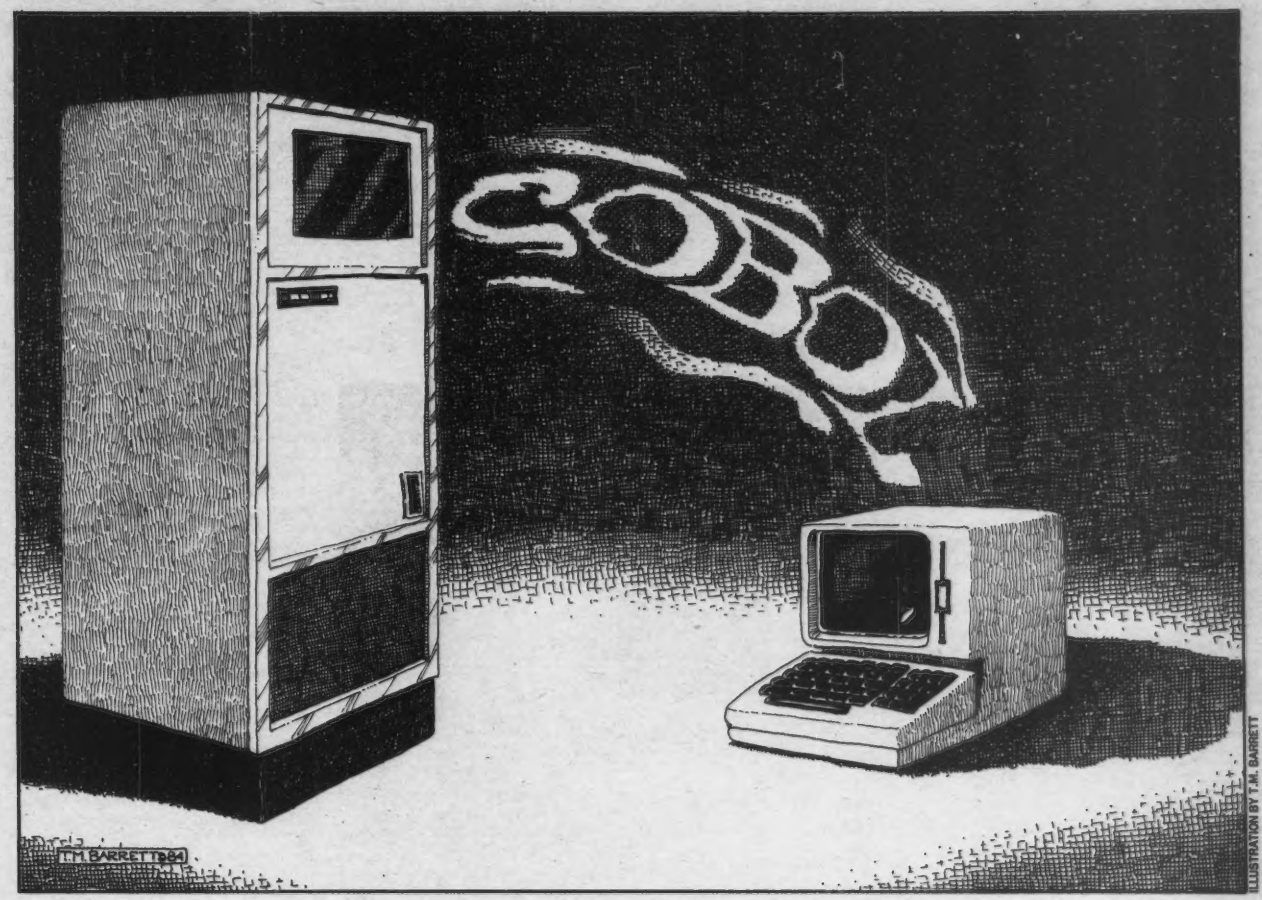


ILLUSTRATION BY T.M. BARRETT

Running your Cobol on micros

(at least some of it sometimes)

By Anthony Fedanzo Jr.

Any Cobol programmer should be able to begin programming on a micro within a week — given microprocessor hardware, a Cobol compiler, word processing for source editing and a data communications package to transfer source and test files.

Even in this age of the microprocessor, the tremendous investment in existing Cobol applications should be exploited as long as possible.

Major vendors such as IBM, Hewlett-Packard Co. and Digital Equipment Corp. have responded almost without notice by providing 16-bit machines to run many mainframe and minicomputer Cobol applications. This response is possible because these companies and other 16-bit systems vendors run Microsoft Corp.'s MS-DOS operating system and one of several Ansi Cobol-74 implementations.

With some relatively minor modifications, many existing mainframe and minicomputer applications can be transported to available 16-bit micros. Two conditions favor decentralized computing by distributing work to microprocessors: the cost of creating replacement application systems and the backlog of systems development.

Microprocessor distributed data processing (DDP) affords the benefits of decentralized computing along with a potentially large saving that would otherwise be expended on replacement systems. While each vendor's product runs a slightly different version of MS-DOS,

the fact that they have this common operating system means they are very similar from an applications perspective.

Little, if any, discernible difference exists between Cobol applications on a major vendor's system and those of the so-called IBM Personal Computer clones. At the level of MS-DOS and Cobol, the similarities between 16-bit micros far overshadow their differences. This situation is unparalleled in the mainframe and minicomputer market, where vendor-to-vendor application transfers are frequently difficult even at the source-code level.

Compatibility of the basic operating system from vendor to vendor has made it possible to implement standard Cobol (and enhancements) on a wide variety of 16-bit systems. Most major vendors have contracted with a software company to implement the version of Cobol they offer. With few exceptions, these implementations are Ansi X3.23-1974-compatible. At this time, there does not appear to be a push taking place to implement Cobol-80 on microprocessors. It is reasonable to assume that the lack of a new version of Cobol simply reflects a benign neglect on the part of vendors and software houses, rather than a deliberate plan to retard the spread of Cobol in the micro world.

The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less, while using existing source code.

Similar implementations of Fortran 77 (Ansi 3.98) have taken place within the last two to three years. It is now possible to transport Fortran 77 code from, for example, an HP 3000 minicomputer, make a few slight I/O syntax changes and then bring it up on either an IBM Personal Computer or HP 150 without further modification. Business applications and some scientific Fortran applications can be moved from system to system with very little modification to the source. Because most business applications are written in Cobol, that language will serve as the exemplar for microprocessor DDP as outlined here.

The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less while still using existing source code. Existing source code in Ascii format can be downloaded to a micro via the available data communications packages, then modified slightly for differences in disk I/O, file types and CRT handling, as required.

The minimum microprocessor hardware required for practical microprocessor DDP is a 256K-byte system with two floppy disk drives. Increasing memory or adding a hard disk expedites the course code conversion task in many cases, but it is not essential. It is fairly easy to convert 2,000-line Cobol programs that access files containing thousands of records using a 256K-byte microprocessor system with two floppy disk drives.

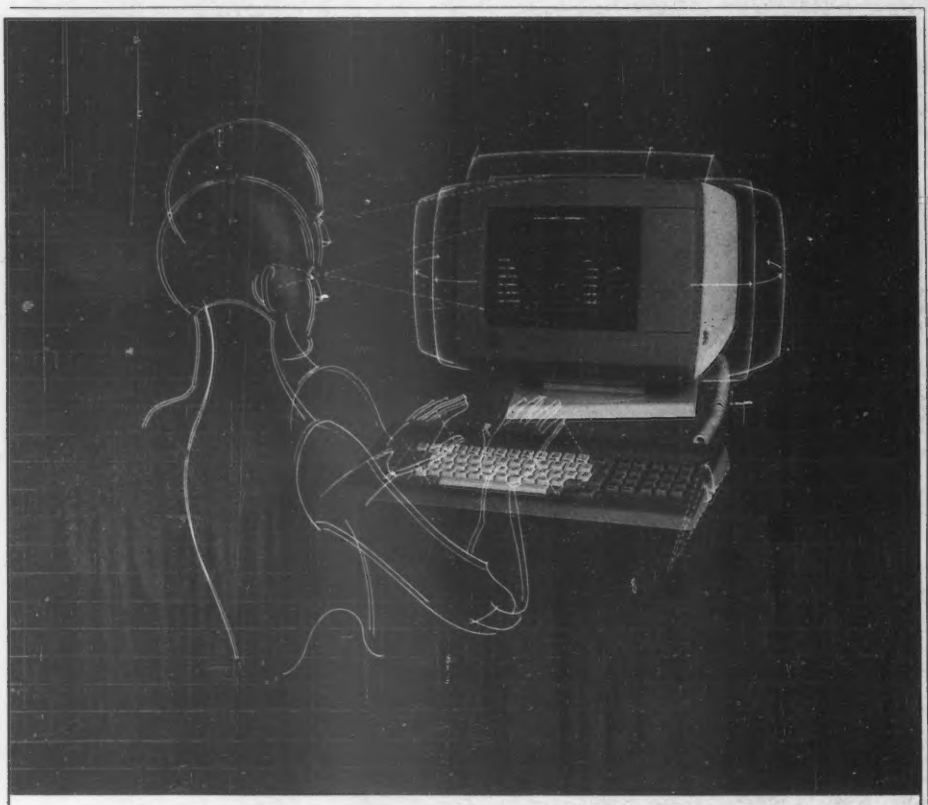
If you are planning on doing a substantial volume of Cobol work, the added expense of larger memory and a hard disk on development systems are worth the cost. The major problem to avoid when using large microprocessor development systems is the chance that executable program size will exceed the main memory limitation of the intended target hardware. This problem can be kept under control by keeping a target machine near the development system for testing purposes.

Advantages of Cobol

Most of the attention that Cobol on microprocessors has received centers upon using the micro as a programmer's workbench. While this is certainly a useful approach to offloading mainframe tasks, it is only one side of the potential use of Cobol on micros. The other side is implicit in the very ability to write and compile mainframe-compatible Cobol on a microprocessor in the first place.

For buyers of 16-bit microprocessors, the "gee-whiz!" emphasis of much software advertising and the problems of coupling micros to mainframes in useful configurations has tended to obscure the fact that they are general-purpose computers in their own right. The ability to function as stand-alone machines means normal Cobol and Fortran programming tasks can be conducted on these systems. When this capability becomes noticed, it's natural to begin thinking about using them to run routine business applications just like their 16-bit minicomputer and larger mainframe cousins.

When micros are used to run routine applications, the goal of centralized data type and format control can be attained while still allowing individuals and groups local control of the data itself. This accomplishment goes a long way toward distributing and decentralizing data processing without abandoning the equally desirable goal of maintaining a single organizational data standard.



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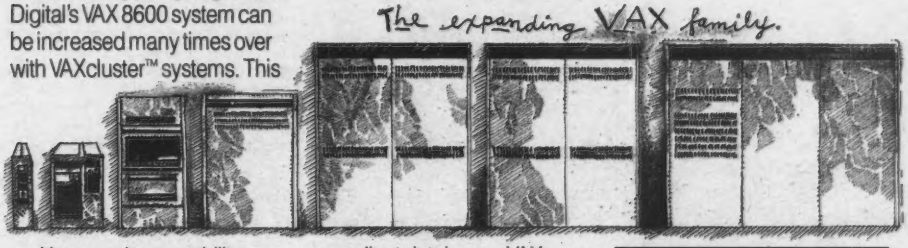

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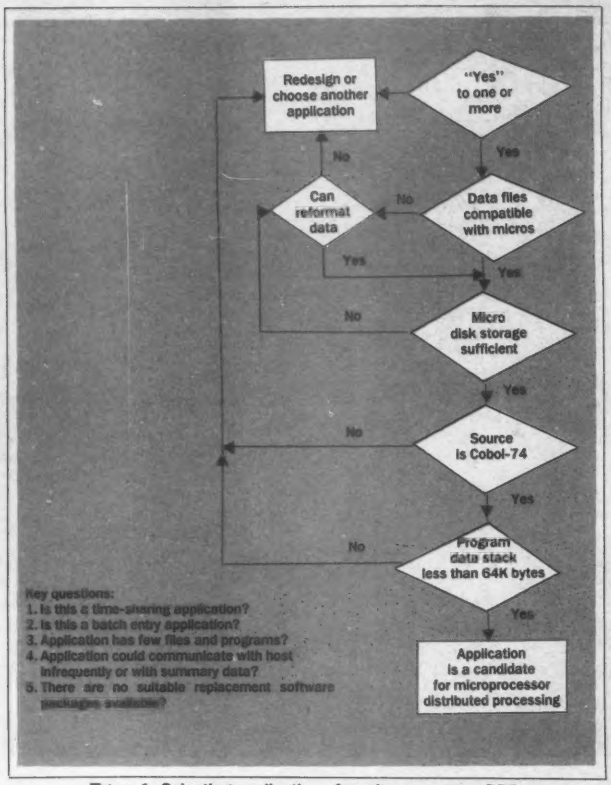

Figure 1. Selecting applications for microprocessor DDP

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The limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

Minimal user retraining is required when existing applications are simply transported to a microprocessor environment. This factor is especially important in light of the time and expense required to train users in various applications. Because the microprocessor itself will require learning new skills, time saved not learning the application will be available for gaining familiarity with the new hardware and procedures.

User familiarity with existing applications can serve as a tool for building basic confidence in those who lack skills or are reluctant to approach the burgeoning generation of microprocessors. Most users will approach a microprocessor with less trepidation if they can still use a man-machine interface with which they are already familiar. This familiarity will be most helpful for batch-entry systems and operators, but it extends to even the more sophisticated look-up and accounting-type systems and to their users as well.

Another notable advantage of transporting existing applications to micros lies in the fairly small amount of DP staff retraining that is required. Since most shops operate with a staff of more or less competent Cobol programmers rather than Pascal or Basic wizards, the expense of either retraining or hiring experts in these other languages can be avoided.

Data processing management must provide its staff with the microprocessor hardware, a Cobol (or Fortran) compiler, a word processing package for source editing and a data communications package to transfer source and test files from host systems to the micro. With these tools, nearly any Cobol programmer should be able to begin programming on the micro within a week. The approximate cost of a compiler, word processing package and communications package is $1,500. Very generous discounts are available from some dealers.

Suitable applications

Most batch data entry systems are suitable candidate applications for microprocessor DDP. This covers the range of those that simply accept input from the CRT and pass it to a plain file, through those that do online validation of key items such as names, Social Security numbers, client IDs and the like. Branch office project management and inventory control systems exemplify other kinds of applications that are readily transported to a microprocessor. This transportation makes the most sense when packaged software either is not available or would require significant conversion from existing systems to utilize.

Figure 1 shows the general procedure for determining whether an application is a likely candidate for conversion to microprocessor DDP. The essential steps are those that determine data structure, operating cost and program size factors. If these criteria are satisfied, most applications that satisfy them can be moved to a microprocessor.

Locally relevant detail is not always required by a home office. Many time-sharing systems can be transported to and implemented on local microprocessors with a minimum amount of change. Typically, older systems are easier to convert to microprocessor DDP since they tend to be built in less highly integrated modules than newer systems. Micro-to-host data transfer can be facilitated by sending all data in fixed format Ascii files.

This strategy succeeds in most cases because summary reporting rather than wholesale data base transfers frequently constitute the bulk of micro-to-host interactions. In addition, so long as both host and micro can manipulate Ascii data with minimal conversion it is the simplest solution to the data exchange format problem.

For example, an accounts receivable and payable system based on local invoice billing cycles is operable independent of a host system if the Cobol source code and keyed files (Isam or Ksam) are transported to a micro. Since the information a head office typically requires includes weekly sales volumes, plus accounts receivable and accounts payable balances by general ledger account number, this data can be processed locally and sent to the host in summary form.

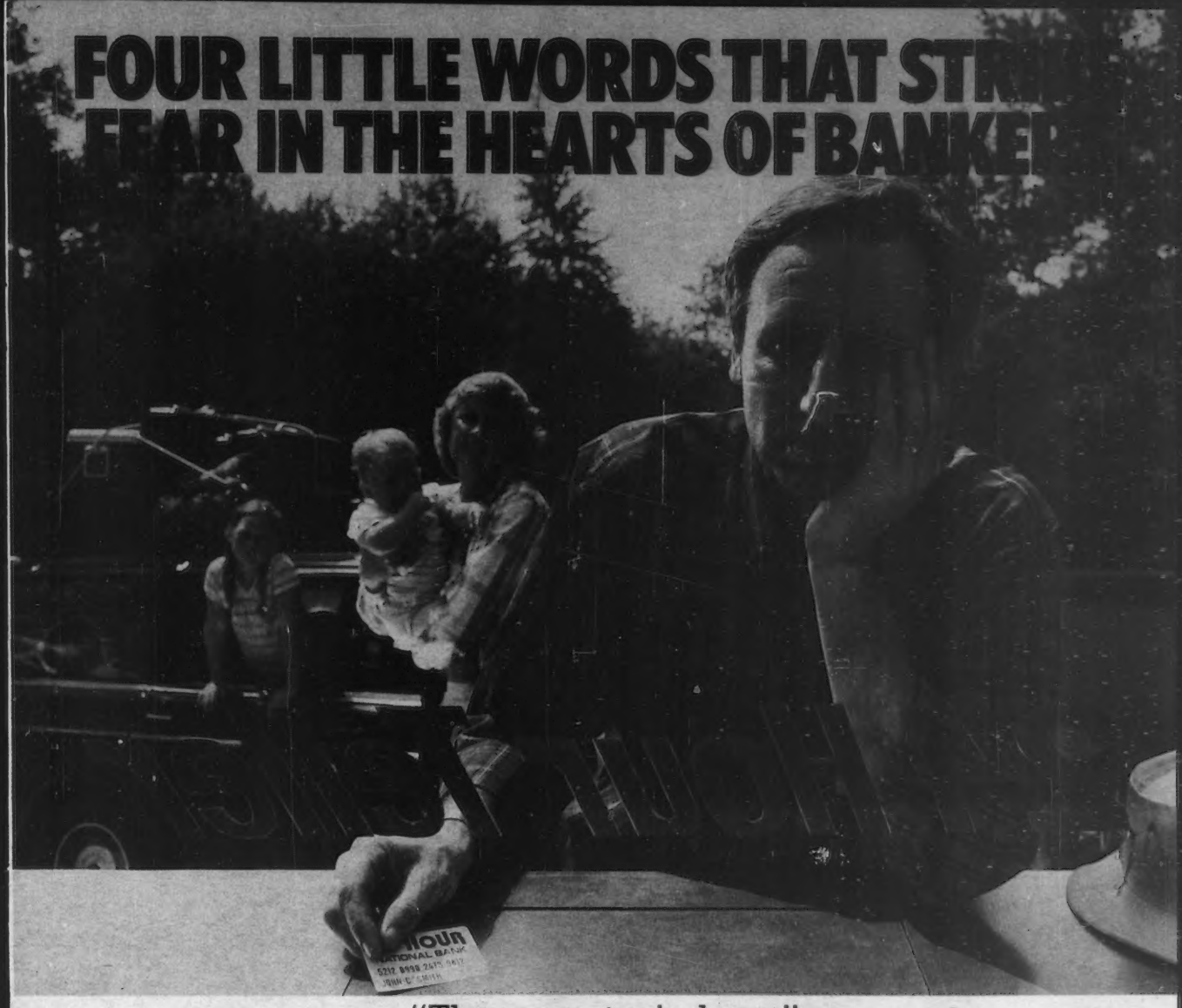
At this time, the limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

This factor tends to exclude software that is built upon data base management system (DBMS) packages until Cobol-accessible versions of the mainframe and minicomputer DBMS software are available on micros. It is, however, quite feasible to send subsets of large data bases to micros so long as the transfer takes place in a suitable data format and the data can be held and used locally in plain or Isam files. Transmission of subsets of host data bases will probably comprise the bulk of host-to-micro communications in a microprocessor DDP network.

Technical considerations

A 16-bit microprocessor has an inherent data stack limitation of 64K bytes. This means that applications from 16-bit minicomputers will transport without encountering this limitation. Minicomputers and mainframes that have a larger word size or data address could present problems if the programs to be transported to a micro use a data area larger than 64K bytes. In these cases, the solution is to modularize the program's tasks by either creating separate programs that are run separately or separate programs that are

FOUR LITTLE WORDS THAT STR... FEAR IN THE HEARTS OF BANKE...



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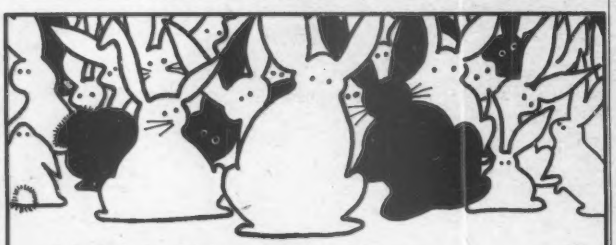

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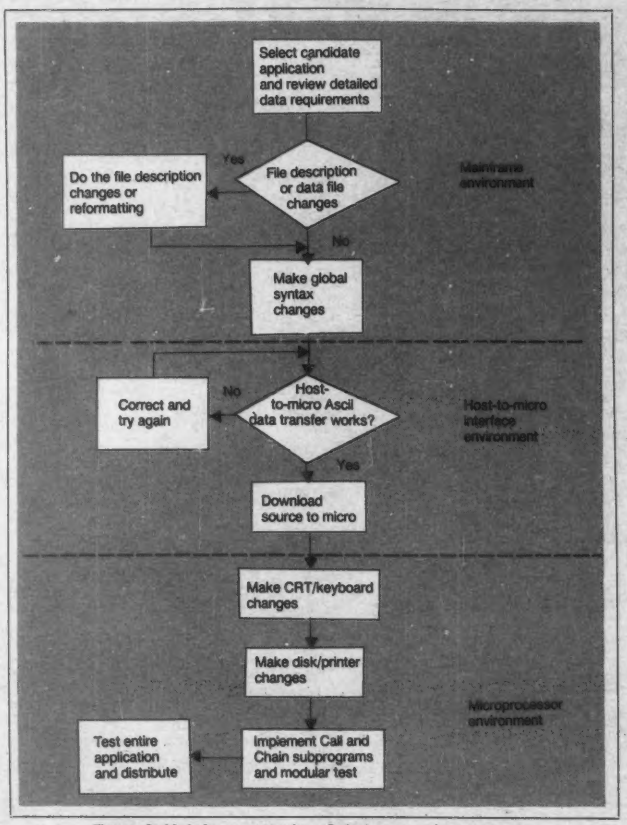

Figure 2. Mainframe-to-micro Cobol conversion process

linked via the CHAIN statement familiar to Basic users.

As outlined in Figure 2, there is a general procedure for transporting and converting applications to a 16-bit micro. Note that the selection process shown in Figure 1 leads into the tasks required for actually doing the application transportation and conversion. As noted previously, the key factors in such a conversion center upon data, then programs, once the cost justification is completed.

Generally, those applications written in Cobol (or Fortran) that utilize plain files, Isam or Ksam files or relative (random or direct) access files can all be transported to major vendor's 16-bit microprocessors. Practical limitations on program sizes are discussed below and have to be considered on a case-by-case basis.

One obvious limit to program size tends to be just how long it takes the microprocessor to execute a code segment before getting back to the user. In Cobol, one hundred lines of IF . . . ELSE . . . logic seems to be a practical limit above which people notice that response time is not virtually instantaneous. Good structured programming will help minimize this perceived execution time significantly.

As on many mainframes, data files accessed by Cobol programs exist in a Cobol format that requires some minor, but necessary, reformatting before they can be transferred as plain Ascii files or used by programs written in another language. For example, micro Cobol sequential files have two leading bytes of data prefixed to the data files. Relative files have six bytes of header information in the first record of each file. Index files have three bytes prefixed to each data record plus a separate key file.

This file and/or record housekeeping information is transmitted to the host by the available data communications packages. Therefore, it must be stripped off prior to transmission by the micro or upon receipt at the host. In either case, the task is a fairly trivial exercise in data reformatting.

Until a major vendor releases a DBMS package that can be accessed by micro Cobol, three familiar file types make up the range of data storage formats available. These are plan sequential, relative and Index (Isam) files.

Sequential files are available in two forms, depending upon whether the file was created within the micro Cobol environment or from another source such as a word processing package. The relative files, sometimes called direct or random-access files, are used virtually identically to those found on mainframes and minis. Index files in micro Cobol allow a single key only, usually up to 60 characters in length. Judicious selection of the fields making up this key will usually allow it to do double duty as a more complex sorting method.

It is worthwhile to attempt to emulate the microprocessor environment on your mainframe, at least with respect to file structures. This will assist in pretransport changes and provide an opportunity to think through potential problems before they are encountered on the microprocessor. A related advantage of an emulation step is the fact that program changes can be made much faster on most mainframes and minicomputers than on a micro. This

saving of time can be significant when many programs or lengthy programs need to be transported and converted.

CRT screen displays usually are defined and used within a single micro Cobol program. Two general methods exist for doing this. The first is via the screen section declarations of the data division. In this section, row and column references position field headings, variable fields and their edits. These are referenced by DISPLAY and ACCEPT verbs that simply name the declared screen records.

The second method of CRT handling utilizes direct row and column addressing in the DISPLAY and ACCEPT verb syntax to achieve the same screen layouts as found in the screen section. There are fewer editing options available to the programmer in this second method, but it works equally well.

Most 132-column (or less) lineprinter reports will convert to output on a microprocessor provided two basic conditions are met. First, the WRITE statements must be standard Cobol-74 and contain no machine-dependent carriage control that lacks a counterpart in the micro. Second, the printer selected for the microprocessor must be able to print a full 132 columns; many small system printers print only up to 80 columns. You should also consider whether you need multipart forms. Generally, it is difficult to get more than three-part carbon forms to give a clear image on small-system impact printers.

Hardware requirements

The hardware required to compile micro Cobol programs depends upon the program size. A 256K-byte microprocessor with dual floppy disk drives can easily handle 2,000-line Cobol programs. Compile time for programs of this size is about 15 minutes, including generation of the disk image of the listing file. Linking compiled code is done in a second step, as is usual on mainframes and minis. Actual program execution requires that a special Cobol environment file be resident on disk with the application program(s). At runtime, it is loaded into memory along with the application code, for which it provides a runtime library and debug interface.

Most competent Cobol programmers will have little trouble switching between mainframe or minicomputer Cobol and that available on micros. Structured coding techniques still apply to this environment, as do the usual concerns about data editing and security. A great advantage of using Cobol on 16-bit micros resides in the very low level of programmer retraining required. This holds even more true when the programming task is simply transporting existing code to the smaller machines.

Data security on a microprocessor requires careful consideration. Since no single-user 16-bit microprocessor available today has an automatic, foolproof logon/logoff event record, the need for sensible physical security of sensitive data and programs is evident. Physical security in the form of restricted access to the system and data disks is probably the most useful security measure to safeguard your information.

It is easy to add an encryption/decryption algorithm to your Cobol programs or their runtime library to scramble the data in the files accessed. When this measure is taken, distribute only the executable versions of programs to the remote user microprocessors.

Management perspective

The microprocessor may be the wave of the future, but it is a wave that conceals potentially disastrous undercurrents as well as the promise of more effective computing. The programming environment available on 16-bit micros today resembles that available on minis and mainframes during the mid-1970s. Managers should allow for extra man-hours in their estimates of project time because the relatively fast development tools and compilers found on larger systems are not yet on the market for micro versions of Cobol

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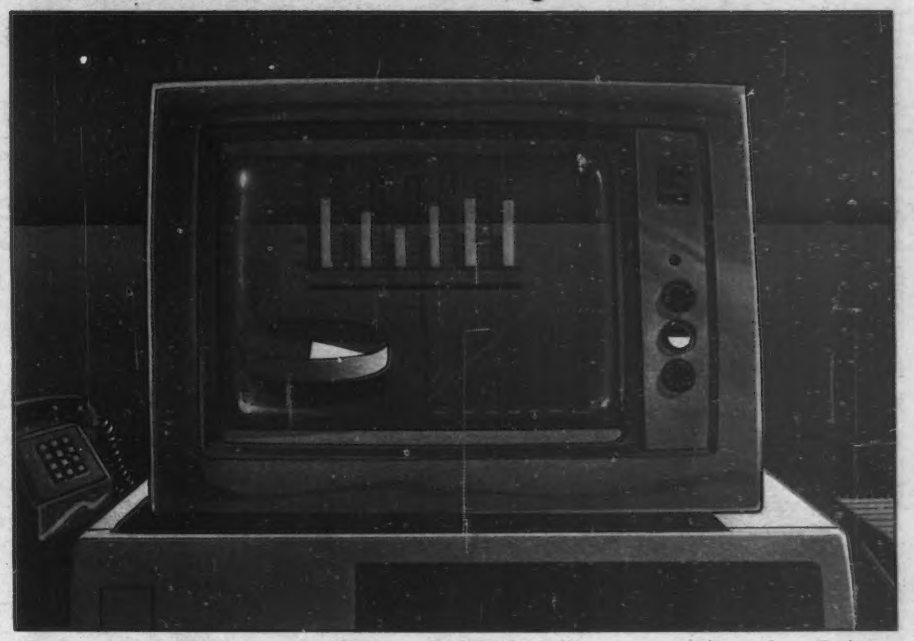

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and Fortran. Use of hard disks and more main memory will alleviate this situation somewhat, but allowing for the extra time is still prudent.

Consequently, transporting software to micros is faster than writing applications on micros from scratch. Global syntax changes can be made to entire source files prior to transferring them to the micro, where editing and compiling are relatively slow.

These differences in overall performance during programming phases of a microprocessor DDP development project indicate the need for careful advance planning and scheduling. In cases where a new system is scheduled for development of a micro DDP system, coding is often more efficiently handled on a mainframe. It can then be transported to appropriate micros for final development and installation.

In many cases, given appropriate project planning and using a standardized hardware and software base upon which to build applications, the cost of transporting existing Cobol application systems to a microprocessor environment also compares favorably with that of creating whole new applications on them. Again, this is because the task of transporting existing source code is often less costly and time-consuming than that of ground-up analysis, design and implementation.

The issue of who buys the microprocessors in an organization should not seriously impact whether they can be used in a microprocessor DDP strategy. A wide degree of latitude in purchasing micros can be accepted so long as those that are acquired all meet some basic requirements.

In order to use the kind of microprocessor DDP strategy outlined here, all 16-bit micros purchased should be able to use MS-DOS Level 2.0 or above. An X3.23-1974 Cobol language and linker compatible with the MS-DOS operating system should be available. A good data communications package for file transfers to and from host systems should be supported on the microprocessor. These are basic requirements in most planned micro acquisitions and place few, but still firm, restrictions upon the number of vendors from whom hardware can be selected.

User familiarity with existing applications tends to facilitate their conversion to a microprocessor environment. Unless the application is seriously in need of revision or replacement, transporting programs to micros compares favorably with buying packaged software. Even the best packages will require time-consuming learning of some entirely new procedures, plus necessitate fairly radical data format conversions if existing data is to be somehow moved into the package's files automatically.

In the worst case, a package will require manual reentry of large volumes of data already on file. Microprocessor DDP allows electronic transfer of this data with no manual reentry.

Any company that has spent time and effort to develop an organizational data standard will not readily abandon that standard just because packaged microprocessor software does not adhere to its standard. Since existing applications presumably already meet the organizational data standard, their migration to a micro poses no serious problems for maintaining the accepted standard.

Transporting programs to micros often compares favorably with buying packaged software.

This consideration can be crucial if the consequence of using a packaged product entails loss of central control over data formats, edits, validations and types. Where this is an issue, microprocessor DDP using transported applications is a reasonable alternative to changing a data standard or the organization's way of doing business.

DDP is lauded for its role in reducing data communications costs, especially when replacing time-sharing systems. Microprocessor DDP also provides the same benefit as a communications cost saver. In addition, the new 16-bit systems provide intelligent single-user workstations for word processing, spreadsheets and graphics. A workstation may not always be cost-justified solely for word processing or spreadsheet usage. But because it can also be used to reduce data communications expense, the synergism of multiple uses for the same hardware ultimately justifies the initial expense.

In the final analysis, the 16-bit microprocessor is a computer in its own right. If it is used with that fact firmly in mind, these machines can make a valuable contribution to the overall efficiency and effectiveness of a firm's computing services.

The rationale for introducing microprocessor DDP can be based upon reducing I/O loading on the mainframe, reducing communications costs, maintaining an organizational data standard or allowing the use of new technology without massive retraining. The success of the undertaking ultimately will depend upon a planned approach and a healthy dose of common sense.

About the author

Anthony Fedanzo Jr. is data processing manager for Harding Lawson Associates, a geotechnical engineering firm in Novato, Calif. He has 10 years' experience with both scientific and business data processing and communications.

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IN DEPTH

The changing picture of federal office systems

Federal government office systems are undergoing widespread changes. The trends include larger systems purchases, more single-vendor microcomputer buys, more systems integrator-type procurements, greater integration of micros and increasing incorporation of office systems organizations into information resource management departments. Internal networking is still in the early stages in government offices, with private branch exchange (PBX) systems and broadband networks being pilot-tested more and more frequently.

By Charles Gularson and Cheryl Smith

These were the findings at a special meeting of the federal government office systems program directors at the Federal Office Automation Conference earlier this month. More than 40 directors of major federal OA programs attended a directors' roundtable discussion, which centered on OA policy, planning and implementation.

A lot has changed in the last year. Just one year ago at the 1983 Federal Office Automation Conference, the program directors of more than 30 key government agencies stated that integration of multiple-vendor office systems was a fundamental problem. Integration is still a problem because most agencies have a multivendor environment. In fiscal year 1983,

88% of federal agencies were serviced predominantly by a single vendor, compared with 74% in 1984. Internal networking was a potential solution to integrating multiple-vendor systems. However, less than 10% of the agencies were pilot testing internal networking systems in 1983; less than 50% were even considering the implementation of internal networks.

This year, most major government agencies are considering internal networks, but less than 40% have pilot projects under development. The use of internal networking is expanding but is still not part of the standard federal government agency office system.

The trend is toward broadband networks and digital PBX systems. The broadband systems are concentrated in the defense agencies and civilian agencies that interface most directly with the defense agencies. It appears that most civilian agencies are using baseband systems and reviewing digital PBX systems as a potential method to integrate data and voice system requirements.

Another internal networking trend in the federal government is the linking of microcomputers into terminal or personal computer networks. Hard-wired connections are costly, and long delays are caused when terminals are relocated as organizations change. To avoid this problem, government agencies are implementing permanently installed terminal networks — a single logical network — to link microcomputers and terminals.

Terminal networks provide for low-speed communications between user devices and can be either part of a broadband solution to connectivity or are a separate baseband or twisted-pair solution to internetting terminals. As the organization changes, microcomputers and terminals can be moved along with the personnel and relinked into the centralized or geographically concentrated terminal network.

Other networks being pilot tested in the federal government are office systems networks to integrate minicomputer-type office systems. These networks interconnect the processing and communications components for geographically localized groups of users. They can range from a single physical network serving the entire group to a hybrid office system network composed of several physical networks interconnected to each other via gateways to form a single logical network service.

Another internal networking trend in the federal government is the development of mainframe networks such as Network Systems Corp.'s Hyperchannel. The mainframe network provides a high bandwidth connection between mainframe computers that perform a large number of high-speed, high-precision computations and support large program libraries and data bases. The mainframe network permits the high-speed transfer of files and more timely access to mass storage devices.

The type and structure of the internal network being considered is directly related to the way the agencies are organized and the age and structure of the buildings. In some buildings, the walls are very thick, and it would be prohibitive to install centralized single physical cable-type networks. In these cases, most agencies are reviewing digital PBXs and smaller geographically located networks.

As of this year, more than 90% of all agencies have implemented electronic mail and spreadsheet applications.

If agencies are centralized organizationally and not constrained by building structure, more broadband cables are considered for implementation. In many respects, this is obvious and reflects the characteristics and operating culture of the specific agency. But it is interesting to note that less than 40% of the government agencies have internal networking pilot projects under development.

Applications development

Another interesting trend is the rapid development and implementation of office applications. In 1983, approximately 90% of the agencies had implemented word processing, and about 80% had implemented some sort of electronic mail system. The statistics dropped rapidly in the area of applications usage. Less than 50% of the agencies last year had implemented some sort of electronic spreadsheet.

In 1984, more than 90% of all agencies have implemented electronic mail and spreadsheet applications. In addition, more than 70% of the agencies already installed or plan to implement other centralized administrative support software. This support software includes:

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	FY '83	FY '84	Change
Word processing	90	1000	+10
Electronic mail	80	90	+10
Spreadsheet calendar	40	90	+40
Business graphics	30	80	+50
Teacher file	20	50	+30
Electronic filing	—	50	+50
Electronic calendar	—	50	+50
File interrogation and report generation	—	40	+40
Data base management	10	50	+40
Business graphics	30	80	+50
Project management and tracking	30	60	+30
Statistical packages	20	40	+20
Computer-aided design	10	20	+10

Figure 1. Applications implemented in fiscal year '83 compared with '84

end-user tools. They are one reason for the growth in usage of administrative support software. Another reason is the increased usage of these packages in microcomputers. Approximately 50% of the responding agencies have now installed these applications compared with 20% in 1983 (see Figure 1).

Merging text, graphics

One area in the federal government where there has been little applications development is in the graphics area. Most agencies are using standard business graphics software that operates on microcomputers, but few have comprehensive systems that merge text and graphics. However, several agencies have data interchange research experiments under way.

The Department of Defense, in cooperation with the National Bureau of Standards, launched a program to expedite the development and implementation of data interchange standards required in a computer-aided graphics program. Over the past decade, there has been an increasing need to exchange graphics and textual data. The types of equipment would include word processors, electronic typewriters, communications terminals, electronic copiers, character printers, typesetters, graphics devices, computer-aided design systems and many others.

This growing demand for data interchange has led to the formation of the Data Interchange Study Group, under the auspices of the American National Standards Institute, to examine data and data interchange requirements for programming languages, office systems, open systems interconnection, data representation, graphics, data dictionaries and data bases. Initial Graphics Exchange Specifications, Graphical Kernel System, Core, Programmer's Hierarchical Interface to Graphics and North American Presentation Level Protocol Standard are some of the standards under review.

More than 60% of the agencies have a need to merge text and graphics, but additional research and development is required before doing so is cost-effective.

Procurements change

Last year, more than 50% of the federal agencies were planning large office systems buys, and almost 30% were planning large microcomputer buys. Several large microcomputer buys were completed in 1984. The U.S. Navy and the Air Force jointly procured more than 10,000 Zenith Data Systems Corp. 150s (IBM-compatible personal computers) and just recently completed a procurement for Zenith Tempest-certified personal computers. The Department of Defense recently completed a joint service procurement for more than 3,400 IBM Tempest-certified personal computers. The list goes on and on.

A major concern a year ago was that most personal computer buys were stand-alones, and no provision for networking these units was made. This, too, has changed. Several agencies have expanded the procurement requirements to include personal computer-type networks and protocol converters.

"A dynamic trend," according to Randy Ivanciw, who assisted in the development of the Program Directors Roundtable, "is for agencies to avoid the possibility of multiple and noncompatible personal computers by procuring large numbers of units that can be networked."

The procurement trend seems to be in the direction of developing specifications for a central CPU or file server for centralized storage, processing and data base management systems with personal computers serving as multifunctional workstations. It appears that the personal computer, with up to 10M bytes of storage, is quickly becoming the de facto multifunctional workstation for which the government has been looking.

Large centrally controlled office system purchases seemed to be the norm rather than the exception during fiscal year 1984. TRG Washington Group predicts that this trend will continue and increase in 1985. Many agencies choose to avoid

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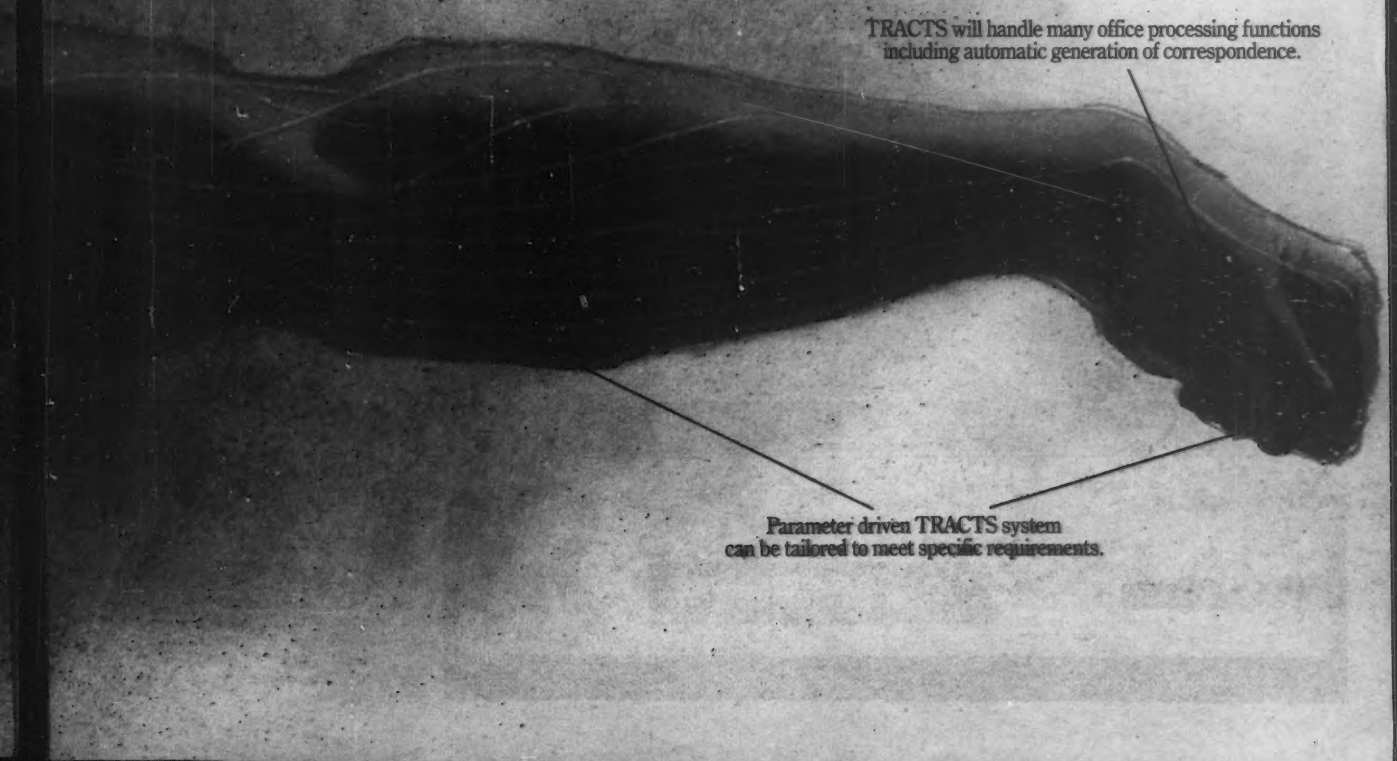


	FY '83	FY '84	Change
Funds	80	60	-20
Costs and benefits	60	80	+20
Design and implementation	30	10	-20
Interface to mainframe	60	80	+20
Choosing software	40	50	+10
OA role conflicts	50	50	—
Start-up training	40	50	+10
Choosing hardware	40	50	+10

Figure 2. Major issues and concerns

interoperability and interconnectivity problems by standardizing on single vendors or multiple vendors with very specific communications protocols: the Intelligence Community and State Department field offices on Wang, the Forest Service on Data General and the Treasury Department Headquarters on DEC.

Procurements are now more functional-specification rather than hardware-specification-oriented. Procurements include the full range of functional requirements, including software (both system and application software capabilities), maintenance, end-user training and systems engineering support.

As experience grows in OA procurements, a lesser emphasis is being put on just the hardware costs. It appears as though the 100% hardware with 100% cost procurements are gone. Too many agencies have been stung by procuring the least expensive hardware buy. It appears cost-effective, but it couldn't be further from reality.

Today's more progressive agencies look toward life cycle cost — the cost over the life of the project. This means that the total cost to implement a system is being evaluated. More agencies want one contractor to provide the hardware and the software required to automate the major functions of the agency, maintain the system, train the end users and resolve any interface issues necessary to make the system fully operational.

In fiscal year 1983, the agencies talked about this concept; in fiscal year 1984 they did something about it, and in fiscal year 1985 it appears as though it will be standard operating procedure.

Organizational aspects

Information resource management (IRM) has been in effect for more than a year. It appears as though IRM departments are more and more responsible for office systems, but the culture or nature of the IRM department is changing. One year ago, data processing professionals did not have an appreciation for the role OA had in information management. That is rapidly changing.

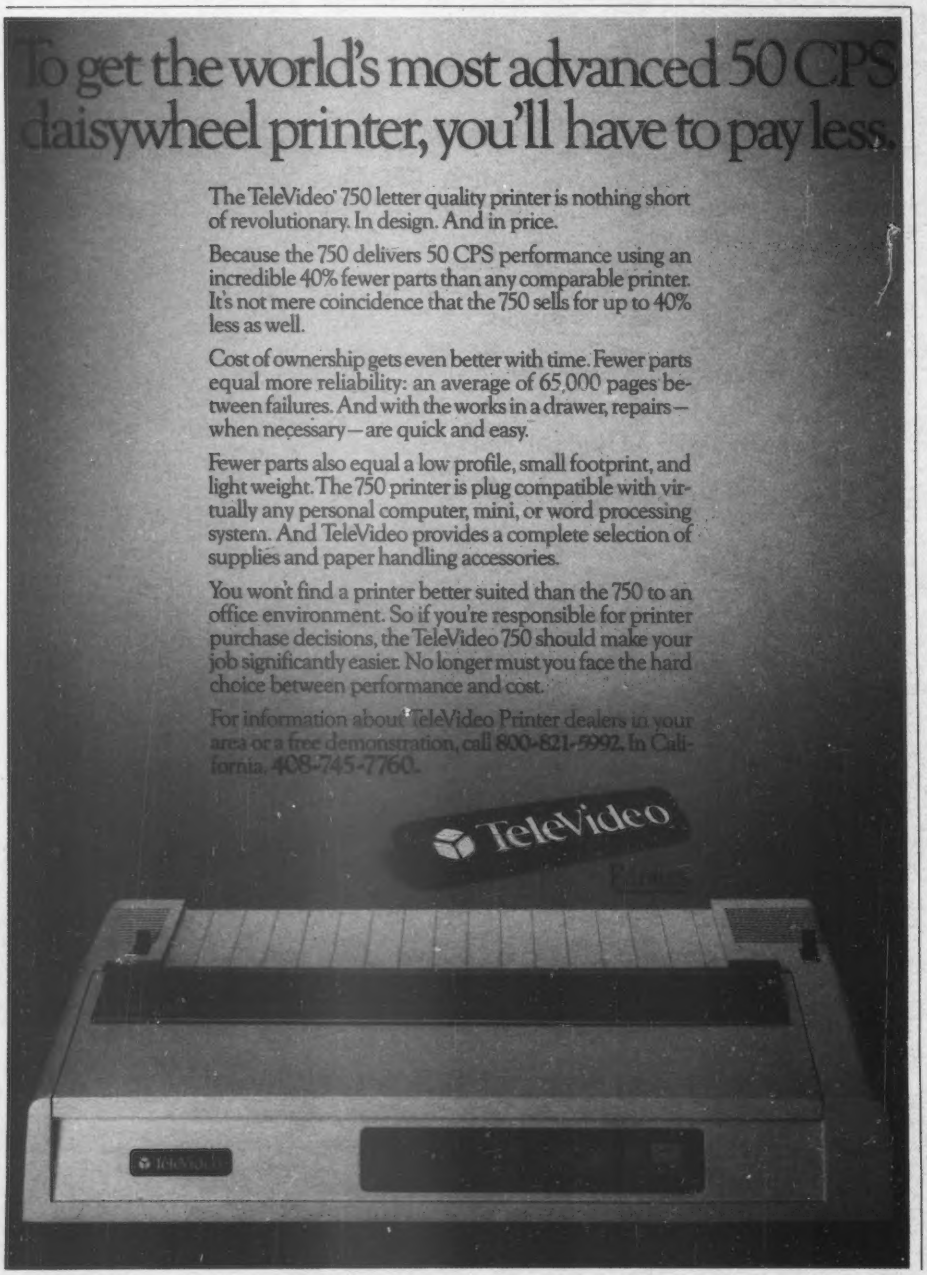
The merging of the information technologies — data processing, records management, communications and OA — is affecting every federal agency. While each agency is addressing the blend of technologies and procedures of IRM differently, they are addressing them in a more structured, comprehensive approach.

OA procurements now include the communications requirements, interoperability with the agency's mainframes requirements and records storage capabilities that were often missing in the specifications a few short years ago.

The major issues and concerns of organizations have shifted from funding to cost/benefit analysis and the technical problem of interfacing to the agencies' mainframes. Figure 2 depicts this shift. The shift will influence the internal structure of IRM organizations.

The federal government has been accused of being behind private industry in the development of complex office systems. Nothing could be further from the truth. At the Program Directors Roundtable at the 1984 Federal Office Automation Conference, more than 45 representatives from approximately 35 key agencies and subagencies discussed how to implement office systems on a cost-effective, productive basis in the federal government.

The trends revealed that the federal government is moving rapidly toward larger, more centrally administered procurements of compatible systems, more microprocessor-based systems, more broadband and digital PBX-based communications capabilities, more integration of text and graphics and more integration of voice and data. One thing is clear: Leading government agencies will be a significant force in the setting of standards for office systems in the second half of the '80s.



About the authors

Charles Gularson was industry chairman of the Federal Office Automation Conference held in Washington, D.C., Nov. 6-8 and moderator of the Office Automation Program Directors Roundtable, where he presented his survey results. He is president of TRG/Washington Group, Inc. in Falls Church, Va.

Cheryl Smith is director, advanced office systems, of TRG/Washington Group.

Who Are End Users?

By Leilani Allen

More than ever before, businesses need an experienced professional to plan for meeting end-user service needs with optimum capacity at reasonable cost. This function will be the province of the information engineer.

Users in 1990 may be classified in three general categories, based on different sets of needs and problems that require different systems solutions. These categories are: central site users, remote users and telecommuters. The categories, in turn, may be subdivided into classes.

The information engineering needs of each subgroup are assessed according to four information areas: processing, storage, transfer and management. The following groups come under the category of central site users:

Clerical. Among information users, this group is still likely to be the largest. Its needs are probably easiest to assess. Typical applications will continue to be data entry (especially the feeding of production information bases), information base inquiry and update, report production and (to a more limited extent) word or text processing.

This work will require massive amounts of storage (both direct-access storage devices and mass storage devices). Processing will still be done largely on the mainframe, although some word processing and ad hoc report writing may be transferred to multiuser, mini or micro configurations.

The challenge for the information engineer is to see beyond the broad label "users." Then he can match technical support to individual needs and wants.

Transfer capabilities will not be especially significant, since this type of user will generally experience information coming to him, in the form of customer phone calls or invoice records. However, there may be some element of data transfer from automatic scanning devices (such as for inventory applications) or in batch mode from outlying sites without their own processing capabilities.

The management component will concern itself with production information base design and maintenance, data security, update standard enforcement, backup and recovery. Sophisticated, real-time performance monitoring, analysis and diagnostic tools will also be essential.

Professional. IBM estimates that by 1990, 50% of all professional workers will have direct access to the computer system. International

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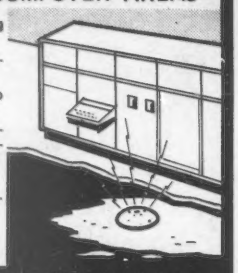

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Data Corp. puts the figure at 65%. This class includes analysts and managers of all types, engineers and programmers. Typical applications will be spreadsheet and statistical analysis, modeling, graphics, computer-aided design and text processing. The majority of processing will be done on micros and minis, with the ability to download data from the mainframe. With the exception of computer-aided design and manufacturing, incremental storage requirements will be fairly negligible, and transfer requirements will be confined primarily to electronic mail and access to external information sources via time-sharing vendors.

Management issues will include data handling protocols, the enforcement of design standards and integration of information bases. Capacity management will be particularly crucial because this type of work tends to grow in a volatile and significant fashion. Analysis of employee productivity, particularly the relationship between given levels of response time to productivity, will be a major focus.

Executives. There is no question that this group will experience increased hands-on use of the computer. However, few executives will use the computer as their most trusted or most frequently accessed information source. It is interesting to note that much of the current discussion of computer tools for executives centers around the need to provide executives with direct access to the production information bases. This need is based on the assumption that executives will want to enmesh themselves in detailed data manipulation and analysis. Yet executives themselves are far more interested in the big picture.

Access to production information base data will, in all likelihood, be provided by means of daily summary files created by subordinates that can be downloaded to the executive workstation. There, a sophisticated decision support system interface will use the data to update a variety of "canned" graphical and report formats that have been customized to the executive's preferences.

Rather than learning programming syntax and commands, the executive will merely type one character (for example, "S" for "sales report") or point to a report icon on the screen. The program will then show the executive the latest indicators and a variety of "what if" scenarios based on preprogrammed assumptions.

Storage and processing requirements will be minimal. They will be handled by a microcomputer, although the initial preprocessing of the summary data will be done by extraction routines on the mainframes, both central and remote. Transfer will involve shipping the summary data only.

Management requirements will include stringent provisions for data integrity and security. Initially, a high-level analysis of the executive's information needs will have to be performed, most likely using many of the techniques developed in expert systems research. Indeed, the advancement and spread of artificial intelligence and expert systems design methodologies will probably be most fully exploited in the commercial sphere in the creation of executive user interfaces. Ongoing consulting/programming assistance will also be required as information needs change.

Industrial. This will also be a relatively new group of users. It will include workers and supervisors in a wide variety of manufacturing-related roles. Typical applications include inventory control, production control, fault-testing, robotics, inspection, problem diagnosis and repair.

Processing will largely be done on the mainframe and will require a large amount of storage. Once again, expert systems technology will be useful here, as the relevant information about each failure/problem is captured and stored in the knowledge base, which in turn can be accessed and analyzed by problem processing systems. Even if this level of sophistication is not possible, a historical file of incidents will be maintained as a guide for appropriate

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action. Transfer requirements will be negligible for the centralized manufacturing installation.

Management requirements are similar to those of the production information bases but with less stringent update protocols. Education of industrial users will be a key information management element, largely because this group of users has had far less exposure than clerical workers to computer equipment and possesses minimal keyboard skills. As a consequence, voice and image recognition capabilities will be the most important technical enhancement for hardware used in industrial settings.

Remote users

Office staff. Remote offices may be viewed as containing a smaller representation of each of the central site components. Many of the applications will (in fact, must) be identical to those at the central site. However, transfer of information will be a much more crucial element.

Processing will be handled largely by powerful (1M- to 2M-byte) microcomputers with hard disk storage capabilities. Selected data from these individual machines may then be loaded to a local minicomputer, that in turn will be linked via high-speed line to the central site mainframe. The sequence of the transfer process and the regulation of precisely which information will need to be forwarded on to other locations will be a key management issue.

Also, remote education and technical consulting capabilities will be required. Because of the expense and administrative problems associated with maintaining large training staffs in multiple locations, computer-based or computer-aided education will be the primary vehicle for providing expertise to the remote sites. The final management element will be decentralized network performance monitoring and problem diagnosis.

Field. One of the most interesting of the new classes of users will be personnel in field locations. The oil and gas industry, in particular, will need to support decision making at drill sites, off-shore oil platforms and producing fields. The construction industry will also see increased use of technology-supported test and inventory control activities in remote sites. Rugged, portable terminals capable of accessing specialized information bases will be increasingly evident.

Thus, a crew confronting an engineering problem could enter the indicators into the terminal and have that data analyzed by expert systems software to get advice on how to proceed. The time-consuming and costly delays associated with tracking down a human expert to analyze the problem and then try to relay that information over the phone could be virtually eliminated.

Processing responsibilities will be shared between the portable terminals and the central or regional mainframe. Incremental storage requirements would be minimal since most of the transactions would be one-time or ad hoc in nature and would not require significant post-processing or analysis. The transfer element will be significant, probably involving the use of built-in modems and dial-up facilities. Again, depending upon how remote the field locations were, local-area network facilities might serve as the transfer medium.

The time-consuming, costly delays associated with tracking down an expert to analyze the problem and then trying to relay that information over the phone could be virtually eliminated.

The management issues would be security, the selection of appropriate network architectures and, of course, field training. Also, the physical maintenance of the machines themselves will have to be addressed.

Customers. Once again, this represents a relatively new group of users.

Banks, insurance companies, retail stores and other consumer-driven industries are realizing that to stay competitive in the '90s, they will have to reduce the labor component in the services they provide. Giving customers direct access to information bases is one major way to achieve this goal. Automatic teller machines, home banking, automated check-in terminals at car rental agencies, shopping at home via converter boxes on home TV sets — all of these will become widespread in the next few years, especially in major metropolitan areas.

This past February, IBM, Sears Roebuck & Co. and CBS, Inc. announced a joint venture to develop a nationwide commercial videotex service for households with computers. J.C. Penney, Citicorp and American Express have also expressed interest in this technology. One industry expert predicts that videotex could be a $30 billion industry by the mid-'90s.

Processing will take place largely on the mainframe, although there may be minimal intelligence at the node. Storage requirements may be quite significant, especially to hold large customer archive files. Information from these files will be intensely analyzed to support future marketing strategies and will constitute a major information asset.

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Transfer will also be a significant and costly element, primarily because of the need for leased lines. Management issues will predominate. These issues will range from privacy and security concerns to backup, recovery and equipment repair to maintain stringent availability standards.

Telecommuters

This final major category will be the most diverse group of all. It will include permanent and part-time employees working at odd hours and accessing a wide range of information sources.

Sales. New technical developments will allow the traveling sales representative to achieve a higher level of communications sophistication. Portable computers will be used for everything from typing up the notes of a meeting to dialing up a home-office computer to demonstrate product features. The sales representative might also use a portable to call up needed information (such as current delivery schedules, price quotes, discount or financing options). Instead of leaving brochures, the representative might leave a complete, customized proposal.

These developments should help shorten the overall sales cycle and enhance the revenue-generating ability of a sales force. In addition, the portable terminal could transmit updated sales or forecast data directly to the home or regional office, thereby improving communications between management and its sales operatives. This development may also reduce the amount of clerical support required at field sales offices since contracts could be generated by computer as well.

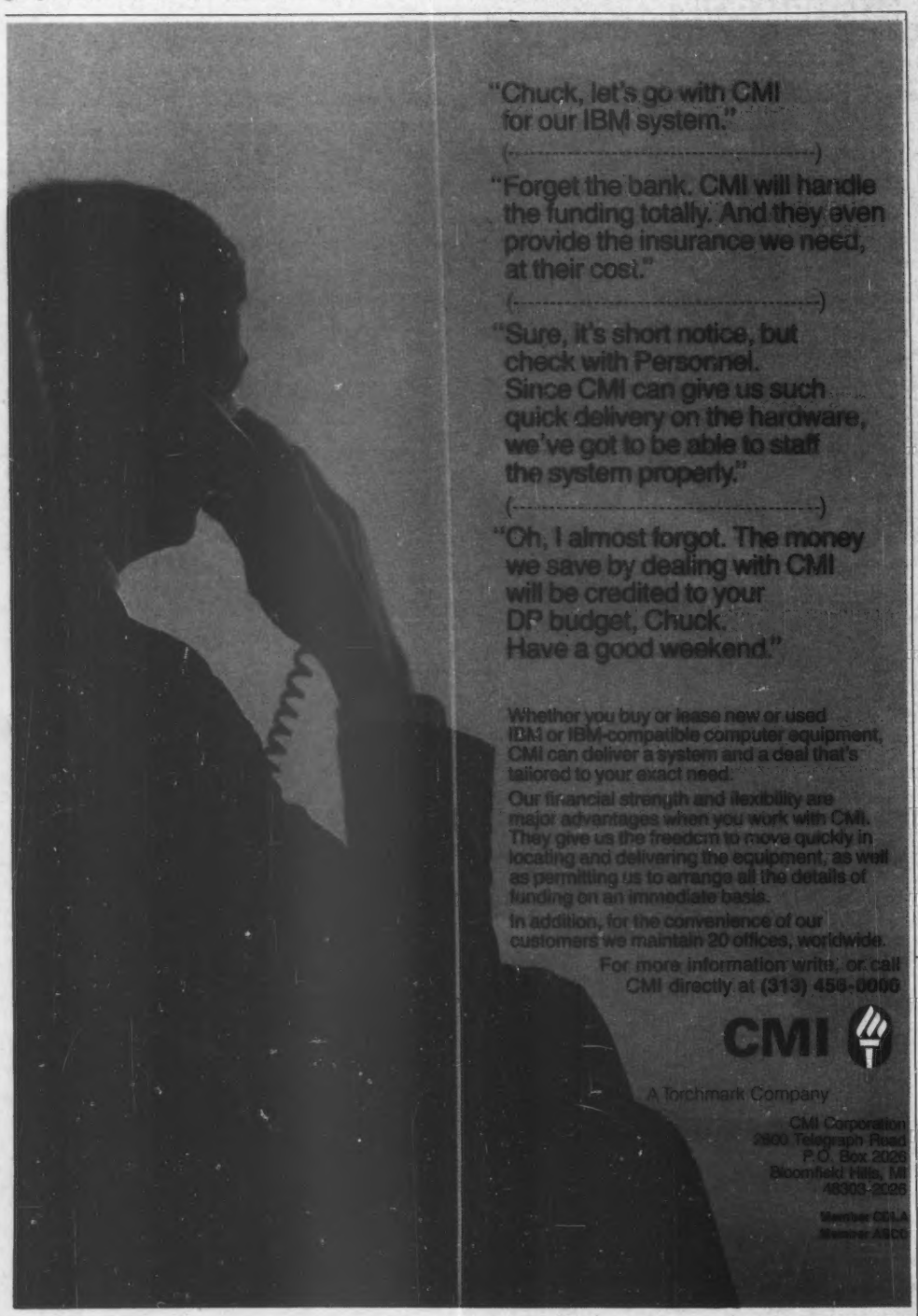
Cellular radio systems in large metropolitan areas will finally make car phones feasible, allowing sales representatives to stay in touch with their customer bases and significantly reducing telephone tag, which is frustrating and unproductive.

Word processing and financial analysis could probably be handled by the portables directly, with the more sophisticated demonstrations and inquiry processing handled by regional minicomputers or central-site mainframes. Storage requirements will be minimal. Transfer capabilities could be handled with a local-area network architecture or simple dial-up lines. The key management issues will, once again, be security (contract and pricing information is highly confidential), education and equipment maintenance.

Working parents. Two of the most interesting developments of the last decade have been the vastly increased number of mothers with careers and fathers who wish to play a more active role in the care and raising of children. By the end of the decade, it will be increasingly common to see one or both spouses working primarily from the home.

These working parents will largely be professionals, simply because executives are involved in too many meetings and other face-to-face activities to make telecommuting feasible. Industrial workers are still required to be physically situated in the production environment, and the costs of allowing clericals this work option will probably be viewed as prohibitive. However, the typical white-collar employee usually does a good deal of work in isolation and is far more likely to interact directly with an information base of some kind rather than numerous peers or higher-ups.

Programming, technical documentation, computer-aided authoring systems, financial modeling, credit and brokerage functions — all can be successfully carried out with a telephone and computer at home. The working parent could take care of household chores, dial up the mainframe and



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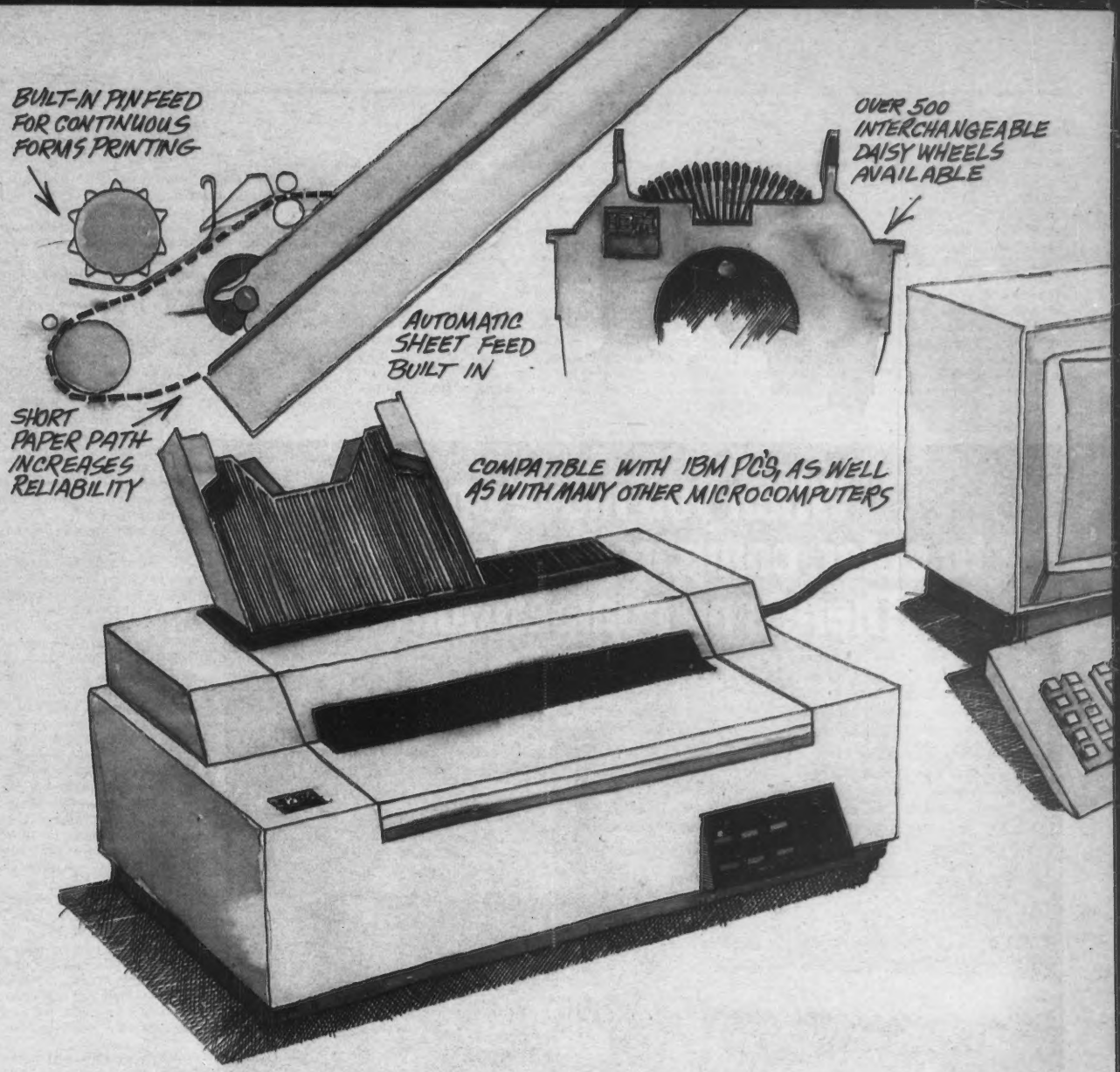

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ask for information to be loaded to his micro and begin the day's analyses. Work might stop when the children return home from school and resume again after dinner. The resultant updated material could be placed in a file to be transmitted to the mainframe during off-peak hours (say, after Johnny Carson or at 7 a.m. while packing the school lunches).

Apart from improving productivity and employee morale, this option offers intriguing capacity management opportunities in terms of work scheduling. The important management issues will primarily be security and integrity of information bases, backup and recovery of home-based systems (what happens when the home hardware breaks down?), the enforcement of data standards and availability of help and consulting facilities to support the home user.

Consultants. One element in today's labor market that is drawing increased attention is the widespread use of consultants as a supplement to, or substitute for, permanent staff. The tremendous rise in the cost of benefit packages and of real estate, as well as an increasingly volatile economic situation, have forced many companies to look long and hard at personnel increases.

Consultants offer a corporation a great deal of flexibility in fulfilling short-term requirements or compensating for real or imagined inadequacies in staff training or capabilities. Complementing this corporate need is an increased entrepreneurial spirit among today's middle managers and senior analysts. These people are attracted by the financial and tax advantages, personal autonomy and growth opportunities that having one's own business presumably offers.

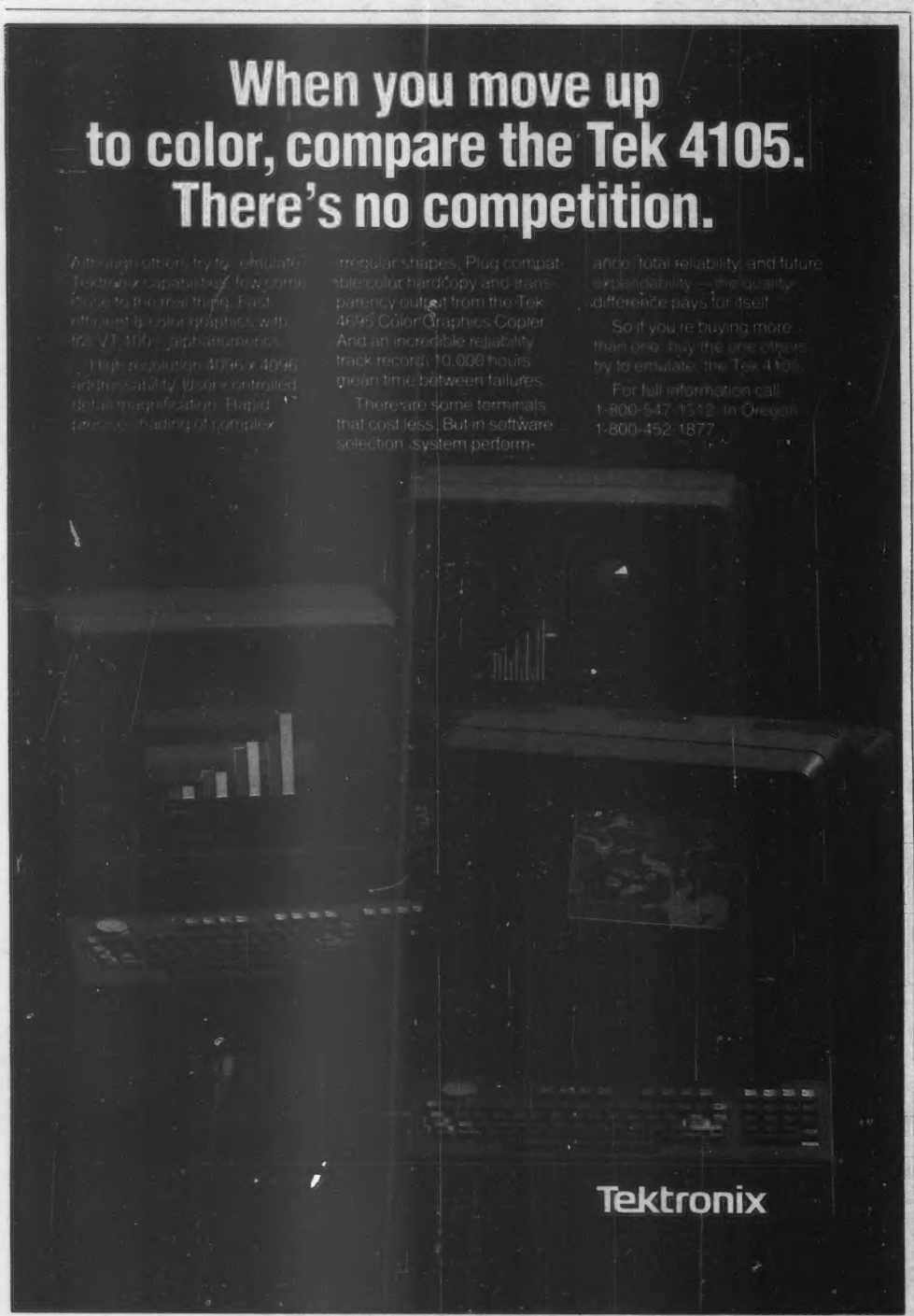
Consultants may not require office space, retirement plans or secretarial support. However, they will require access to corporate information bases. Indeed, the overwhelming part of a typical consultant's job (and, naturally, the biggest component of the fee) is data collection. Streamlining this task will not only allow more time to be spent on solid, site-specific analysis (too often missing from many final reports) but will also allow the client more frequent (perhaps daily) updates as to the contract's progress. Also, allowing the consultant to use client information resources and facilities may result in recommendations that are more feasible.

From an engineering standpoint, consultant processing, storage and transfer needs will be very similar to that of the working parent, although they will be more likely to require access to many different information bases and external time-shared services, depending on the nature of the task. Security and privacy will, once again, be key management issues, and stringent controls will have to be implemented to ensure the proper handling (and perhaps eventual destruction) of confidential information.

Industry trends, technological developments, government regulations, consumer attitudes — all of these are large unknowns. Yet all will affect working people. The challenge to the information engineer is to determine who those people will be, what they wish to do and how they can most productively do it with the best the technology has to offer.

About the author

Leilani Allen is assistant general manager of the Institute for Information Management in Sunnyvale, Calif. She teaches classes in information management in the U.S. and abroad.



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MICROCOMPUTERS

DEC launches LN03 desktop laser printer

LAS VEGAS — Digital Equipment Corp. last week introduced a desktop laser printer that prints eight page/min and carries a $4,195 price tag.

DEC's LN03 can produce 300 dot/in. for text, twice the density of standard dot matrix printers, according to DEC. The LN03 also is said to produce simple business graphics with resolutions up to 150 dot/in.

Resident fonts allow the LN03 to print up to 120 char./line in the vertically aligned portrait mode and up to 150 char./line in horizontal landscape mode, according to the vendor. The printer's input cassette and output tray each hold up to 250 sheets of standard letter-size paper, DEC said.

The device is said to support both single-user and multiuser printing configurations. "A dedicated LN03 offers the single user the ability to add fonts by plugging in [read-only memory] cartridges," said Bruce Hunter, product marketing manager for DEC's Terminals Business Unit.

"When the LN03 is used as a shared resource, [random-access memory] cartridges are plugged in, and the host system down line loads fonts to the printer's expanded memory," he said.

The LN03 is driven by an on-board controller and has a serial interface with a selectable bit/sec rate of up to 19.2K, DEC said. The printer is said to be compatible with many applications written for DEC's LQP02, LA100 and LN01 printers.

Deliveries of the new desktop printers are scheduled to begin in February, according to the firm.

DEC is located in Maynard, Mass. 01754.

TI laptop, designed for mobile professionals, available soon

AUSTIN, Texas — Texas Instruments, Inc. last week introduced Pro-Lite, a 10½-lb portable version of the TI Professional Computer, designed for mobile professionals and available in January for $2,995.

Pro-Lite reportedly features a 12-in. LCD with an 80-col. by 25-line display in text mode and a 640- by 200-pixel resolution (scrollable to 720 by 300 pixels) in graphics mode. Based on an 80C88 microprocessor (the Cmos version of Intel Corp.'s 8088), the Pro-Lite includes 256K bytes of random-access memory (RAM), expandable to 768K bytes; a 79-key, full-size keyboard; and a single 3½-in., 720K-byte microfloppy disk drive.

Pro-Lite runs under Microsoft Corp.'s MS-DOS 2.12. Approximately 30 packages will be available in microfloppy format in first-quarter 1985. These will include applications such as Ashton-Tate's Framework and Dbase-III, languages and vertical-market software, TI said. Other packages licensed on a single-user basis can be downloaded from a desktop Professional through a $75 interface cable, which also can transmit data files from IBM Personal Computers, according to the vendor.

The 768K-byte RAM capability, greater than that provided for most computers running MS-DOS, "will allow Pro-Lite to take advantage of future expert systems and natural language products," TI said.

A battery pack or second microfloppy disk drive, or both, can be added through an expansion box that plugs into the Pro-Lite's back, according to the vendor. The battery pack allows operation of up to five to eight hours and

See TI page 58

IBM-compatible Radio Shack micro bundled with application software

By Kathleen Sullivan
CW West Coast Bureau

FORT WORTH, Texas — Radio Shack Corp. a division of Tandy Corp., this month introduced the newest member of its Microsoft Corp. MS-DOS family of personal computers, the Tandy 1000, a floppy-disk-based system that includes bundled applications software.

The Tandy 1000, which uses the Intel Corp. 8088 microprocessor, is "close to 100% compatible with the IBM Personal Computer," said Ed Juge, director of market planning for Radio Shack.

The Tandy 1000's bundled applications packages, known as Deskmate, feature a variety of software programs, including text processing, spreadsheet, data base management, calendar and electronic mail.

Juge described the Deskmate ap-

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Current well-behaved packages leave user dreams unfulfilled

SMALL TALK
Eric Bender
CW Senior Editor

Today's "well-behaved" personal computer packages play by the rules of Microsoft Corp.'s MS-DOS, docilely going through the operating system every time. They're like well-behaved storybook children, running around everywhere and never getting messed up. They play on networks, in windows, in operating system environments and wherever else they please.

Among the drawbacks in this happy scenario, of course, well-behaved programs tend to be slow and not very interesting.

Best-selling packages such as Lotus Development Corp.'s 1-2-3 generally are ill-behaved Peter Pans rather than Wendys. They bypass the operating system to grab the hardware directly, achieving strong performance advantages.

However, you take your chances introducing them into a new environment. The most striking recent case is the host of best-selling IBM Personal Computer software that's not quite ready for prime time on the Personal Computer AT.

Things get further complicated, naturally enough, under new system software environments such as IBM's Topview or Digital Research, Inc.'s Graphics Environment Manager (GEM).

These new environments potentially offer users jazzy features such as mice, icons and windows and a lot of other benefits as well. And system software vendors say their goals include a way for applications developers to create well-behaved programs that run without modification on every MS-DOS machine, avoid paying any penalties in performance or functionality and benefit fully from the system software features.

But most application software vendors are wary about customizing their products. They are looking at multiple environments — Topview,

See BEHAVE page 62

Analyst says IBM's OA strategy augurs ill for marketplace rivals

By Edward Warner
CW Staff

BOSTON — Office automation consultant Amy D. Wohl thinks IBM's recent introduction of high-powered word processing software for its Personal Computer is "formidable," and that Apple Computer, Inc.'s "take-a-Macintosh-home" promotion will not generate sales to corporations.

Wohl expressed these thoughts during a speech and an interview at the East Coast Computerfaire, a personal computer show here this month.

Wohl, who operates Amy D. Wohl & Associates of Bala-Cynwyd, Pa., predicted that IBM's offering of Displaywrite III for the Personal Computer and Displaywrite 36 for its System 36 minicomputer, with smooth transfer of documents between the two systems, will make things tough for competitors, especially Wang Laboratories, Inc.

Wohl, however, said IBM has yet to offer the business graphics or project management software that she feels are needed by a well-rounded OA vendor. The firm, she added, does possess a competitive advantage in its Topview operating environment.

IBM's internally announced goal, she claimed, is "to own 65% of the Personal Computer market." The most likely way for them to do that, she continued, is by "making certain features that are very attractive only available to those who use its products."

A study by her firm, she noted, found that 88% of the corporations it surveyed required that their personal computers have Microsoft Corp. MS-DOS operating systems, for IBM Personal Computer compatibility. She added that 72% of the firms made IBM's PC-DOS an outright requirement, limiting purchases only to IBM equipment.

Apple Computer's Macintosh, currently being offered for overnight free trial to anyone holding a major credit card, has failed to crack the OA market, she claimed, because it lacks software.

The OA market is not closed to the arrival of a new vendor, she observed, adding that the likely candidate will be a Japanese firm marketing its hardware through the existing channels of an American vendor who is "product bankrupt, but has a strong distribution scheme."

Novell offers software for Netware local-area networks

OREM, Utah — Novell, Inc. has introduced Advanced Netware 1.0, local-area network operating system software that is said to support the use of multiple file servers on all Netware local-area networks and transparent bridges between these networks. It also reportedly has the ability to access special-function network servers.

Advanced Netware gives every user access to eight servers simultaneously, with storage capabilities up to 500M bytes per server, according to Novell.

Netware bridges essentially act as servers and communicate through a normal local-area network link, the vendor said. Reception and transmission are said to be completely transparent to the user.

The bridges reportedly also allow a personal computer to access the network from remote locations in either remote or local execution mode.

Remote execution "provides actual distributed processing by transferring applications programs and their data via modem for remote execution at the bridged personal computer," according to the company. This feature is said to give the remote personal computer all the capabilities of a local node. In local execution, only screen and keyboard information is transmitted to the remote personal computer, Novell said.

Using Novell documentation, managers can write the software necessary to accommodate special functions on a value-added server, and those functions will be fully integrated into the local-area network, according to the vendor.

Advanced Netware, which may be adapted to all Netware networks, is priced at $1,595 and will be delivered by January, Novell said.

Novell is located at 1170 N. Industrial Park Drive, Orem, Utah 84057.

TI from page 57

costs $129. The second disk drive is priced at $595, while the two options together carry a $724 price tag.

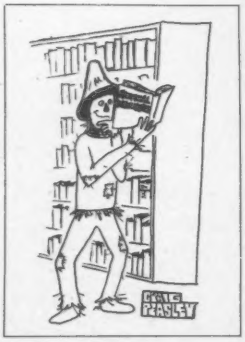
Internal option slots

A 300 bit/sec internal modem, priced at $300, is said to plug into one of the Pro-Lite's two internal option slots. The other slot can accept an RS-232 interface, an external monitor adapter or programmable read-only memory modules provided for specific applications, according to TI.

A 12-in. external monochrome monitor costs $325, while a color monitor is priced at $695. An optional 45-char./sec thermal transfer printer handles either plain or thermal paper and costs $499.

Initially, TI will sell the Pro-Lite through direct and value-added reseller channels.

More information is available from Texas Instruments Data Systems Group through P.O. Box 809063, Dallas, Texas 75380.



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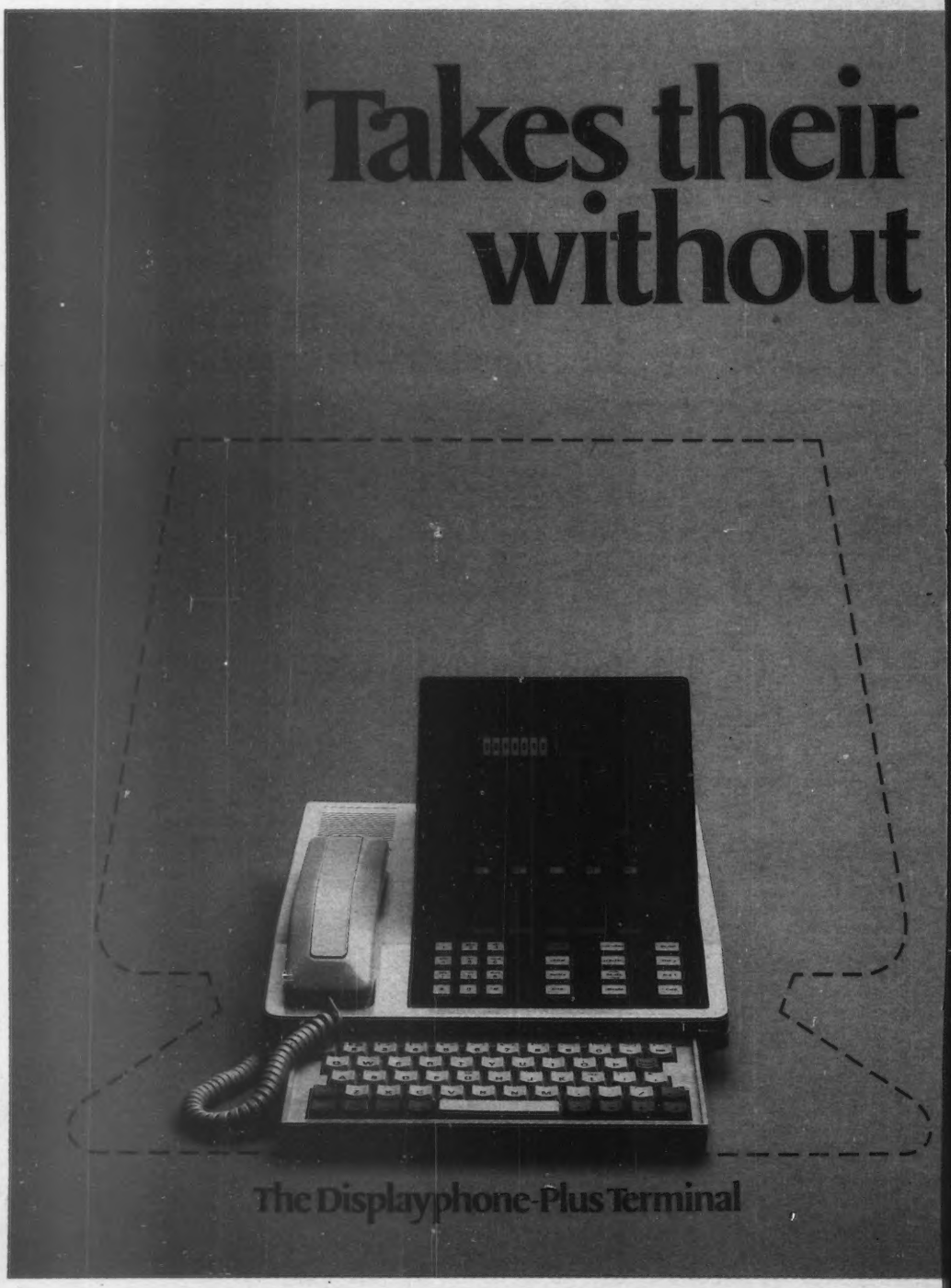

The Displayphone-Plus Terminal

Data base program bows for IBM micros

CAMBRIDGE, Mass. — Infocom, Inc. has introduced a relational data base program for IBM Personal Computers said to be designed for nonprogrammers.

Cornerstone is designed for business professionals who need a data base for individual applications such as tracking sales leads, customer support and personnel management, Infocom said. According to the vendor, Cornerstone enables a nonprogrammer to create a data base by answering a series of simple questions.

The program is said to feature an interactive report writer that can draw information from any file or combination of files. It also allows users to add notes or comments to a file at any time, the vendor said.

Cornerstone includes a Help facility and an options feature, Infocom said. The options key shows the user exactly what to type next, whether it is a command, file name or item in the data base, the vendor said.

The program is available for the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. It can be used in conjunction with packages such as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar, as well as other spreadsheet and word processing programs. The price is $495.

Infocom is at 55 Wheeler St., Cambridge, Mass. 02138.

Orchid adds products to PCnet

FREMONT, Calif. — Orchid Technology has introduced several products for its PCnet local-area network for the IBM Personal Computers, including Lancomm, which reportedly allows dumb terminals on PCnet to function as intelligent workstations when linked with an IBM Personal Computer.

Lancomm reportedly allows Personal Computers on PCnet to support two dumb terminals simultaneously, with each terminal having full access to the network and its shared resources.

Also introduced for PCnet were PCnetmail, an electronic mail software package, and Command Spooler, a print spooler for the network, according to Orchid Technology.

PCnetmail reportedly offers store and forward functions and automatic remote networking communications. Command Spooler reportedly allows PCnet users to share one to three printers connected to their machines with other users or servers.

Prices for the products are: Lancomm, $395; PCnetmail, $695; and Command Spooler, $195.

For more information, Orchid Technology is located at 47790 Westinghouse Drive, Fremont, Calif. 94539.

terminal's place the space.

It's important that the Displayphone-Plus* terminal can fit with an existing information management system, offering download emulation of virtually any cursor addressing conversational CRT and plug-and-play compatibility with the VT-100.

But what makes the Displayphone-Plus amazing is that it does it all while still fitting comfortably on a desk.

Inside the Displayphone-Plus terminal is a 212A compatible auto answer modem with selectable 300/1200 BPS transmission rates and full automatic log-on. So it can meet the needs of managers and other occasional data users, while emulating such terminals as the Digital Equipment Corporation VT-100* and VT-52* ADDS [illegible] Regent 25,* and many [illegible].

On the outside it's [illegible] and easy-to-read amber screen [illegible] the Displayphone-Plus terminal [illegible] performance of large, [illegible] Its sophisticated telephone [illegible] it to surpass them with a 99-number [illegible] automatic dialing, and [illegible] And it's as easy as a [illegible]

To find out more about the Displayphone-Plus terminal, call 1-800-[illegible] or write to Northern Telecom Inc., Advanced Communications Terminals Division, P.O. Box 202048, Dallas, TX 75220-2048.

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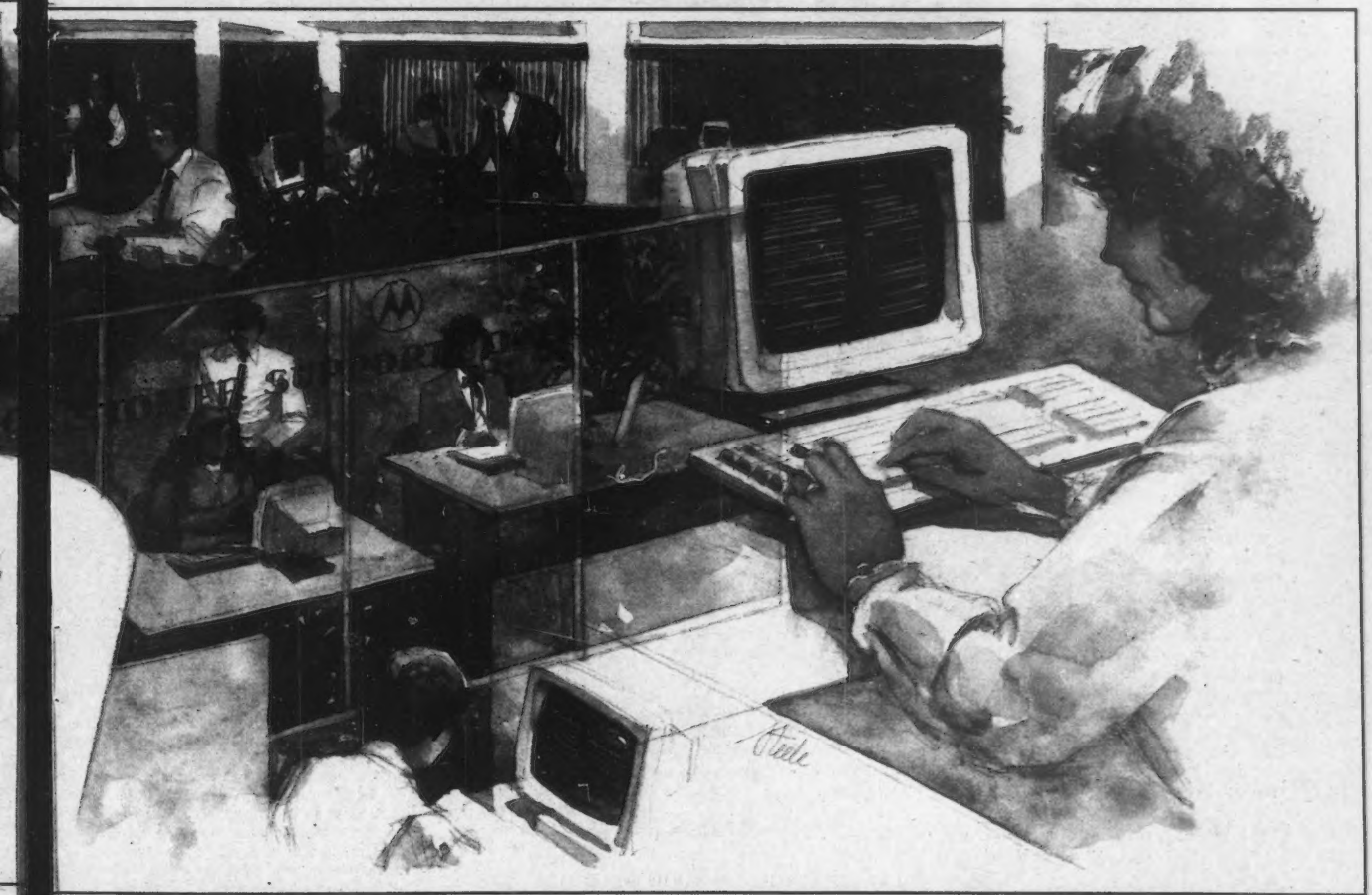

SOFTWARE

BV ENGINEERING
PC Plot

BV Engineering has announced PC Plot, a graphing program that is said to create linear, semilogarithmic and full logarithmic plots in any combination of the X and Y axes.

PC Plot requires 64K bytes of memory and runs on microcomputers including the IBM Personal Computer, Zenith Data Systems Corp. 100 and 150, Corona Data Systems, Inc. Corona PC and on micros from Compaq Computer Corp. and Columbia Data Products, Inc.

The price for PC Plot is $62.95.

BV Engineering, Suite 207, 2200 Business Way, Riverside, Calif. 92501.

WARNER SOFTWARE, INC.
Desk Organizer

Warner Software, Inc. has announced that its Desk Organizer software is available for microcomputers running Microsoft Corp.'s MS-DOS operating system and for the Apple Computer, Inc. Macintosh.

Desk Organizer reportedly is used in filing, organizing notes, telephone dialing, writing and printing, calculating, transferring data and managing time.

The MS-DOS version will run on the IBM Personal Computer, Personal Computer XT, PCjr, Personal Computer AT and compatibles, the vendor said. The MS-DOS version requires a minimum of 95K bytes of random-access memory.

The price for the Macintosh version, scheduled for December shipment, is $149. Cost for the MS-DOS version is $195.

Warner Software, 666 Fifth Ave., New York, N.Y. 10103.

ADVANCED PRODUCTIVITY SOFTWARE
Executime

Advanced Productivity Software has announced an enhanced version of its Executime time management/scheduler program for the IBM Personal Computer AT, using either IBM's PC Xenix or IBM's PC-DOS 3.0 operating system.

Among enhancements in the new version is a Multiple Schedule File capability, which allows a single user to create many separate schedule files, the vendor said.

A Universal Search option is said to speed the user's access to a list of appointments and reminders that contain any user-defined name, word or symbol.

The Warning Notice feature reportedly alerts the user when a requested appointment time has already been scheduled.

The price for Executime for PC-DOS is $49.95; for Xenix, it is priced at $69.95.

Advanced Productivity, 2565 E. Chapman Ave., Fullerton, Calif. 92631.

See **TOOLS** page 64

Irma adapted to IBM's AT

NORCROSS, Ga. — Digital Communications Associates, Inc. has announced that its Irma micro-to-mainframe communications board has been adapted to the IBM Personal Computer AT.

Using Irma, the Personal Computer AT can emulate an IBM 3278 or 3279 terminal and transfer data to and from a mainframe while retaining its stand-alone capabilities, Digital Communications said.

The adaptation of Irma to the Personal Computer AT brings to the AT a host of software programs developed with the Irma board in mind, according to the company.

Irma for the IBM Personal Computer AT is priced at $1,195.

Digital Communications Associates is located at 303 Technology Park, Norcross, Ga. 30092.

BEHAVE from page 57

IBM's Virtual Device Interface (VDI), GEM, Microsoft Windows, Microsoft Networks and others — which may conflict with each other.

In the most spectacular example, Topview, the leading contender for widespread adoption, does not seem to be compatible with VDI or IBM's PC Network or much of anything else. Developers want to follow IBM's lead, but many are not quite sure what that means.

Until the dust clears on the requirements for the well-behaved packages of the future, many software developers will avoid committing themselves, and those impressive new environments may not mean much to users.

TANDY from page 57

plications as a set of "desk organizer" programs and said the bundled packages are not meant to compete with "full-blown" applications software.

The Tandy 1000, which comes with one floppy disk drive and a detachable keyboard, provides 128K bytes of random-access memory, expandable to 360K bytes, the company said. It is priced at $1,199, exclusive of the monitor.

The model features a three-voice sound generator and several built-in capabilities, including support for color and monochrome monitors, parallel printer port, joystick and light pen ports, according to the company.

Radio Shack is located at 1700 One Tandy Center, Fort Worth, Texas 76102.

Forte puts mainframe graphics on your PC

Get mainframe graphics right at your desk. With the ForteGraph™ Emulator.

Just add it to the Forte PJ™ communications adaptor. Without using an extra slot. You're ready to roll with a single PC keystroke.

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ForteGraph is entirely soft-loaded. So you can send, receive and store files while host sessions remain untouched. You can even save your mainframe graphics on your own diskettes. And print copies right in your office.

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DunsPlus: The Micro Solution That Reflects The Way You Do Business

You've heard the buzzwords: user friendly, integrated, smarter, faster, cheaper. But when you push the rhetoric aside you're still asking the same question, "Why can't I get a system that solves more problems than it creates?"

You can. It's called DunsPlus and it's built to respond to your information-related business demands without creating demands of its own.

DunsPlus gives the IBM PC XT a built-in business environment. This lets you mold DunsPlus to fit the way you do business.

Within the DunsPlus environment is a software base of the best. Lotus, MultiMate, Western Union electronic mail (to name but a few), are all ready for immediate use. But additional programs to solve your unique problems can also be added with ease.

Instant, yet controlled, access to your choice of mainframes and subscription databases is also a part of the DunsPlus environment. And transferring data throughout the system is as easy as moving a piece of paper from the In Box to the Out Box.

Immediate end-user productivity is not an issue: DunsPlus is a menu-driven system requiring minimal keystrokes for maximum results.

Installation is not an issue: DunsPlus is installed by IBM.

End-user training is not an issue: Training and support are part and parcel of DunsPlus.

Flexibility is not an issue: Any part of the DunsPlus solution--hardware, software, or service--can be tailored to meet your precise business needs.

In fact, there are no issues. DunsPlus does what you want, the way you want it--now.

Designing systems that reflect the way you do business is business as usual for us. NOMAD2, the premier 4th-Generation-Language/DBMS from D&B Computing Services, has made us a leader in the field of information management services. And as your needs evolve, so do we. DunsPlus is just the latest step in translating technological advances into usable business tools --tools that reflect the way you do business.

DunsPlus:
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DunsPlus

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For further information call: 800-DNB-PLUS. Or drop your business card into an envelope and mail it to DunsPlus, 187 Danbury Road, Wilton, CT 06897.

Lotus spreadsheet and graphics from Lotus Development Corporation. MultiMate™ word processing from MultiMate International, Inc. IBM is a registered trademark of International Business Machines Corporation. DunsPlus is a trademark of DunsPlus, a company of The Dun & Bradstreet Corporation. NOMAD2 is a trademark of D&B Computing Services, Inc.

TOOLS from page 62

SOFTWARE HOUSE
System 1032

Software House has introduced a version of its System 1032 data base management system for the Digital Equipment Corp. Microvax. System 1032 for the DEC Microvax reportedly is based on the System 1032 for DEC's VAX-11 minicomputers.

System 1032 did not require downscaling to run on the Microvax and contains the same features found in the VAX-11 version, the vendor said. Those features reportedly include user assistance, on-line documentation, full programming capabilities, host language interface, support for DEC's Decnet, data security and compiled procedures.

System 1032 for the Microvax is priced at $3,000 per CPU for those who already own a System 1032. Otherwise, it is priced at $8,000 for the first copy.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

COMPUTER SCIENCE INNOVATIONS, INC.
Software Design Language

Computer Science Innovations, Inc. has developed a software design language for use with the IBM Personal Computer and systems compatible with Microsoft Corp.'s MS-DOS operating system.

Software Design Language produces formatted design documents, the vendor said. The program reportedly can be used to design software at the system, process, module and algorithm levels. It is said to allow data items to be named and to support user-defined keywords.

A permanent license for the product costs $400.

Computer Science Innovations, P.O. Box 2628, Satellite Beach, Fla. 32937.

DATABASE DESIGN, INC.
Action Diagrammer

Database Design, Inc. has introduced a software editor that runs on the IBM Personal Computer and compatibles.

Action Diagrammer is said to be based on a structured, graphics representation of the action comprising a software program as a hierarchy of bracketed blocks. Action diagrams reportedly can represent a high-level overview of a system and progressively decompose it to the level of executable code.

At the highest overview level, a program is pictured as single bracket. Fully expanded control flow and processing logic are grouped and bracketed in deeper levels of the hierarchy, the vendor said.

Action Diagrammer is said to supply control structure syntax in English, Cobol, PL/I, Fortran, C, Pascal and fourth-generation languages automatically. It reportedly enables the system designer to integrate modularity, hierarchical organization, control flow and structured logic constructs.

The package is priced at $495.

Database Design, 2020 Hogback Road, Ann Arbor, Mich. 48104.

ZONTEC, INC.
SPC Timesaver

Zontec, Inc. has introduced a color statistical process control (SPC) package that runs on the IBM Personal Computer.

SPC Timesaver is said to be an integrated system for the analysis, storage and display of SPC chart information. These charts reveal variations from norm, percentage, failures, trends, number of samples outside control and whether the process is capable of producing the desired results, the vendor said.

The program reportedly is able to maintain multiple sets of control limits within a single set of samples. Five main analysis functions are included: control charts, descriptive statistics and capability, tool wear and economic impact analysis.

SPC Timesaver will run on any IBM Personal Computer or compatible with 256K bytes of memory. A color graphics board is recommended by the vendor, although the program will reportedly work with a monochrome display. Price is $695.

Zontec, Suite 4135, 1329 E. Kemper Road, Cincinnati, Ohio 45246.

FUJITSU MICROELECTRONICS, INC.
Concurrent CP/M 86 for Micro 16S

Fujitsu Microelectronics, Inc. has announced that Digital Research, Inc.'s Concurrent CP/M 86 operating system is now available for Fujitsu's Micro 16S series of personal business computers.

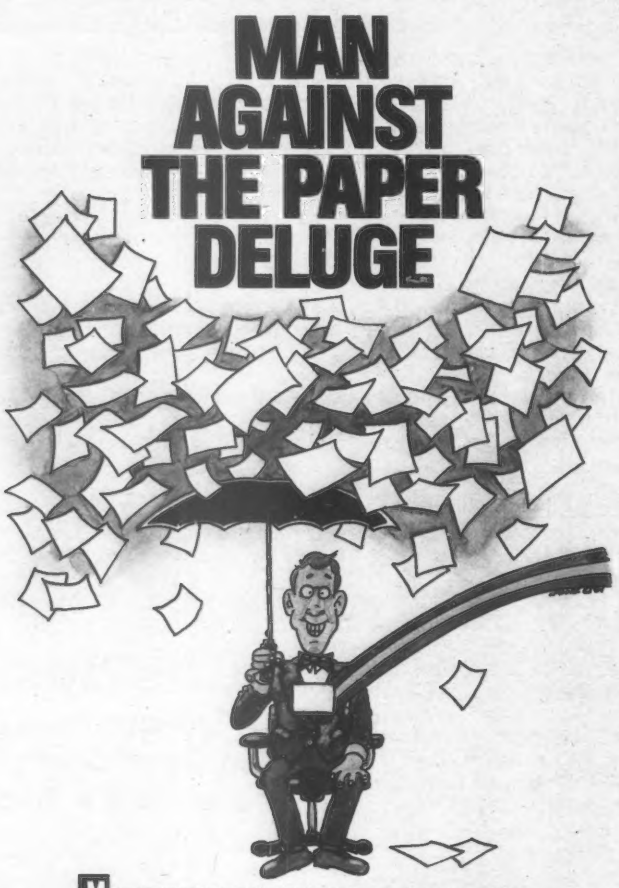
The multiuser Concurrent CP/M 86 operating system is said to enable Micro 16S and Micro 16SX computers to perform more than one computing task simultaneously and to support up to five external terminals.

As the main console, the Micro 16S can support four virtual consoles that can be accessed by pressing a designated combination of keys. The virtual consoles allow up to four programs to be active on the Micro 16S. While one program is being viewed, other programs can be completing tasks such as financial calculations in the background, the vendor said.

Concurrent CP/M 86 is priced at $200. A five-user configuration of the Micro 16SX system with a 13M-byte hard disk, 896 bytes of user random-access memory, controllers, color monitor and the multiuser operating system, excluding terminals and printer, is priced at $7,100.

Fujitsu Microelectronics, 3320 Scott Blvd., Santa Clara, Calif. 95051.

See TOOLS page 66



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For more information call: Roger Cox at (203) 762-2511. Or drop your business card into an envelope and mail it to Roger at: D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc.

TOOLS from page 64

DATAGRAPHIC SYSTEMS, INC.
CAD Master Version 2.0

Datagraphic Systems, Inc. has announced enhancements to its CAD Master, a computer-aided design (CAD) software package for the IBM Personal Computer line.

Among CAD Master's features reportedly are autodimensioning, autotolerancing, architectural dimensioning, curve fitting, filleting, mirror imaging and computation of volume and perimeter. Also included are a line and arc editor, a bill-of-materials function, data base extraction and a finite element preprocessor. Other features include "rubberbanding" of lines, arcs, circles and arrows.

CAD Master Version 2.0 is $1,795.

Datagraphic Systems, 9101 General Drive, Plymouth, Mich. 48170.

MICRO-SYSTEMS SOFTWARE, INC.
M-Edit

Micro-Systems Software, Inc. has introduced M-Edit, a tool for full screen editing on the IBM Personal Computer.

M-Edit reportedly offers word-processor-like functionality in as many as eight windows at once and also supports data transfer between windows. M-Edit includes block copy/block move functions. Each of the package's windows reportedly has a 64K-byte buffer and allows text lines of up to 240 char. to be created.

M-Edit is priced at $199.

Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, Fla. 33431.

MITCHELL MANAGEMENT SYSTEMS, INC.
Quick-Plan

Mitchell Management Systems, Inc. has introduced its Quick-Plan project planning software for personal computers running under Microsoft Corp.'s MS-DOS operating system.

Quick-Plan reportedly builds project plans based on time, costs and resources using a series of menus written in English. It is said to offer editing and modeling capabilities and 13 different report formats.

Quick-Plan's four types of connectors and use of precedence diagramming reportedly allow it to handle 250 activities, 99 resources and 500 connectors for each project.

Quick-Plan is priced at $995.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

PRIORITY SOFTWARE PACKAGING, INC.
Softcop

Priority Software Packaging, Inc. introduced a series of software protection programs said to guard against software piracy on micros utilizing IBM's PC-DOS, Digital Research, Inc.'s CP/M 86, Softech Microsystems, Inc.'s P-System and Apple Computer, Inc.'s Apple DOS.

Software Controlled Operating Protection (Softcop) is said to use a combination of validation and defense systems to provide security of protected software.

In a related announcement, Priority Software said it is now offering Softguard System's Superlok software protection program for IBM's PC-DOS applications through a licensing agreement with Softguard.

Softcop and Superlok are said to feature hard-disk support and authorized backup. According to the vendor, all forms of software can be protected with Superlok and Softcop, including templates and interpretive Basic programs. The protection programs are said to be self-executing and invisible to legitimate users of the protected software.

Software protection ranges in price from 10 cents to $1.50 per diskette. The actual cost depends on duplication quantities and the protection features required.

Priority Software Packaging, Unit A, 2730 S. Harbor Blvd., Santa Ana, Calif. 92704.

TEXAS INSTRUMENTS, INC.
Framework, Dbase III for TI Professional

Texas Instruments, Inc. has announced that Ashton-Tate's Framework and Dbase III packages will be available on the TI Professional in the first quarter of 1985.

Framework, an integrated software package, combines outlining, business graphics, data management, word processing, telecommunications, Microsoft Corp. MS-DOS access, spreadsheet capabilities and a programming language, TI said. The recommended configuration for a TI Professional includes 512K bytes of random-access memory and either two floppy disk drives or a Winchester disk drive.

Dbase III is a data base management system that features storage capacity of over 2G records per file (contingent on system hardware), 128 fields per data base and the ability to use 10 files simultaneously.

Each product will cost $695.

Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

ENERTRONICS RESEARCH, INC.
Energraphics

Enertronics Research, Inc. has introduced Energraphics graphics software for the IBM Personal Computer.

Energraphics reportedly provides users with the ability to create and display or print line charts, pie charts and two- and three-dimensional bar charts. Also provided is the ability to produce maps, electronic circuit diagrams, mechanical and architectural drawings and surface diagrams, among other forms, Enertron-

Continued on page 68

CONDUCTOR: The MIS Approach to End-User Access

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TSI International:
Innovations In Managing End-User Computing From Dun & Bradstreet

TSI International

a company of The Dun & Bradstreet Corporation

For the facts on CONDUCTOR, call 1-800-227-3800, Ext. 7005 or drop your business card into an envelope and mail it to Marketing Service, TSI International, 187 Danbury Road, Wilton, Connecticut 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc. DunsPlus is a trademark of DunsPlus, a company of The Dun & Bradstreet Corporation.

Continued from page 66

ics said.

Energraphics reportedly offers interactive operation and supports color and monochrome displays and several dot matrix printers.

Energraphics is priced at $350.

Enertronics Research, Suite 207, 150 N. Meramec, St. Louis, Mo. 63105.

SCIENCE MANAGEMENT CORP.
Thoroughbred

Science Management Corp. has introduced its Thoroughbred multiuser operating system (TB/OS) for the IBM Personal Computer AT.

The operating system reportedly upgrades the AT to a three-user system that can run more than one application simultaneously. TB/OS also reportedly operates in connection with standard Personal Computer AT hardware and does not require custom boards for the upgrade to multiuser status.

TB/OS does not interact with either PC Xenix or PC-DOS, both announced for the AT by IBM, the vendor said.

TB/OS is priced at $795.

Science Management, 1011 Rt. 22 W., Bridgewater, N.J. 08807.

TEXAS INSTRUMENTS, INC.
Natural Link

Texas Instruments, Inc. has announced Natural Link software packages, which permit TI Professional Computer users to interact with popular software programs using simple English commands.

The 10 packages reportedly translate user-constructed English sentences into commands that the underlying software package will recognize. The same Natural Link format is followed in each application package, giving users a familiar interface for all Natural Link programs, TI said.

The Natural Link programs are configured for Microsoft Corp.'s MS-DOS 2.1 operating system and nine application programs: Multimate, from Multimate International Corp.; Wordstar, from Micropro International Corp.; BPS Business Graphics, from Business Professional Software, Inc.; Supercalc 3 and Easywriter II, from Sorcim/Information Unlimited Software; Dbase III, from Ashton-Tate; Peachtext 5000, from Peachtree Software, Inc.; Microsoft's Multiplan; and Microrim, Inc.'s R:Base 4000 series.

Natural Link Access to MS-DOS requires a TI Professional or Portable Professional with MS-DOS 2.1 and at least 256K bytes of random-access memory (RAM). Natural Link Commands products require MS-DOS 2.1, 512K bytes of RAM and a Winchester disk drive.

Natural Link Access to MS-DOS costs $75. Natural Link Command programs for the above applications are priced at $125 each, the vendor said.

Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

SYSTEMS

MOLECULAR COMPUTER, INC.
Molecular Series 36

Molecular Computer, Inc. has introduced the Series 36, a multiprocessor system said to provide each user with one or more dedicated personal computers through individual application processors.

All processors and peripherals for all users are contained within the Series 36's systems cabinet. The cabinet reportedly contains slots for up to 36 application processors, both 5¼-in. and 8-in. floppy disk drives, a Winchester disk drive and an optional cartridge tape drive.

Each user's application processor is interconnected to all others by the vendor's M/Bus interprocessors link, which also provides high-speed access to shared disks, printers and other peripherals, the vendor said.

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MICROCOMPUTERS

Molecular's N/Star network operating system software is said to provide the ability to share data files and is compatible with Digital Research, Inc.'s CP/M 80 and CP/M 86.

The combination of the M/Bus and N/Star is said to provide the equivalent of a local-area network within the systems cabinet.

Price is $21,995 without tape backup and $23,995 with disk drive.

Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

WICAT SYSTEMS, INC.
System 2220; Wicat Interactive Terminal

Wicat Systems, Inc. has introduced its System 2220 and its Wicat Interactive Terminals (WIT).

A rack-mounted unit said to offer 1M byte to 12M bytes of random-access memory (RAM), the System 2220 reportedly supports from one to 64 users and features a 12.5-MHz Motorola, Inc. 68000 central processing unit, a 4K-byte cache memory system and zero wait states.

The WIT is said to be an intelligent color graphics terminal offering a video interface option.

The WIT also includes a 12.5-MHz Motorola 68000 microprocessor with zero wait states and 256K bytes of downloadable RAM, according to the vendor.

It also includes commands for high-speed graphics operation and audio capabilities, Wicat Systems said.

The System 2220 is priced starting at $40,720, including the central processing unit, an 80M-byte disk and a 17M-byte, ¼-in. tape cartridge storage unit.

The WIT is priced starting at $7,275, including the video option.

Wicat Systems, P.O. Box 539, 1875 S. State, Orem, Utah 84057.

COMMUNICATIONS

SOPHIA COMPUTER SYSTEMS, INC.
Link for IBM Personal Computer and SA700 emulators

Sophia Computers Systems, Inc. has announced a serial communication link for the IBM Personal Computer said to allow users to download microprocessor software developed on the Personal Computer XT to Sophia's in-circuit emulators.

The link supports file transfer from the Personal Computer XT to Sophia's SA700 in-circuit emulators, used for troubleshooting. Any Microsoft Corp. MS-DOS or IBM PC-DOS system can function as a development host, the company said.

The price for the Personal Computer link is $495.

Sophia Computer Systems, 3337 Kifer Road, Santa Clara, Calif. 95051.

CXI, INC.
3270 and 3278/79 IBM Personal Computer connections

CXI, Inc. has announced that its 3270 IBM Personal Computer connections and 3278/79 IBM Personal Computer connections are compatible with the Personal Computer AT under IBM's PC-DOS 3.0 and 3.1.

The connection products reportedly allow users to have from one to five host sessions, a PC-DOS session and two notepads displayed on screen simultaneously.

The CXI 3270 Personal Computer connections reportedly are available either as coaxial or modem connections and provide IBM 3270 emulation.

The 3270 Personal Computer coaxial and modem connections are $1,595 each. The 3278/79 Personal Computer coaxial and modem connections are $1,145 each.

CXI, 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

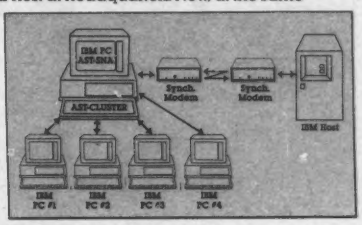
See TALK page 71

MICRO-TO-MAINFRAME COMMUNICATIONS SOLUTIONS."

Working IBM® PCs into the world of large computers used to be quite a headache. But now that I've discovered AST and their full line of proven communication products, things are much easier.

Last week, for instance, the VP of Finance said he wanted to tie into the mainframe down the hall from his office. AST-PCOX™ was my instant answer. We just plugged the card into his PC, then ran a coax cable to the IBM controller. No need to double up on hardware or clutter up his desk with a dumb terminal.

Today, I'm solving a complex problem for our Director of Marketing. He's opening up seventeen new field sales offices and wants to link them to our host at headquarters. Now, at the same time, we're looking to convert our communication network from BSC to SNA. Here, AST really protects my hardware investment.



You see, they have SNA and BSC products with the same hardware. I can go with AST-BSC™ today, then just load another disk to upgrade to AST-SNA.™ And with AST's plug-in cards, PCs can emulate 3274/6 controllers, 3278-2 or 3279-2A terminals, even 3287 printers.

Using PCs in the field sales offices gives us the flexibility of local PC processing power, and the benefit of concurrent processing, since we can use DOS functions while continuing to maintain the mainframe link. It's certainly a major money-saver—a really smart alternative to dumb terminals.

We expect those new sales offices to grow rapidly. When they do, I'll be adding AST cluster functions so we can use PCs, and VT-100™ or compatible terminals in our configuration. All of them can communicate to headquarters over a shared phone line to reduce our telecommunications costs.

Meeting the challenge of change is a key part of my job. AST always has the products to help me. Like LANs to tie all PCs—including ATs and PCjrs together. There's also an AST-525I™ to connect PCs to System/34, System/36 and System/38 for powerful interactive communications from remote sites.

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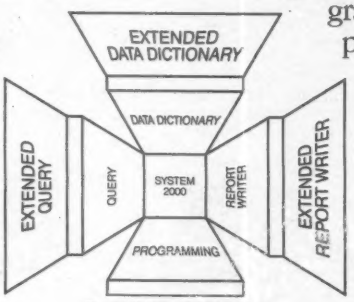

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TALK from page 69

FORTE DATA SYSTEMS
Fortegraph and Forte 3270 PC

Forte Data Systems has announced that its Fortegraph software and board package is compatible with the Irma communications board from Digital Communications Associates, Inc. It also introduced its Forte 3270 PC for the IBM Personal Computer.

Fortegraph, running in conjunction with the Irma emulator for the IBM 3278/79 terminal, reportedly provides mainframe graphics capabilities to the Personal Computer. It also allows the Personal Computer to function as an IBM color graphics terminal and offers emulation of the IBM 3279 Model S3G color graphics terminal with programmed symbols, according to the vendor.

Forte 3270 PC reportedly allows the Personal Computer to gain the functions of an IBM 3270 workstation.

Forte 3270 PC is priced at $1,495. Fortegraph with Irma compatibility is priced at $1,595.

Forte Data Systems, 2205 Fortune Drive, San Jose, Calif. 95131.

STORAGE

PERCOM DATA CORP.
Superior Interior

Percom Data Corp. has introduced its Superior Interior 22M-byte, half-height disk storage system for the IBM Personal Computer.

The Superior Interior reportedly mounts in the second drive position of a Personal Computer, giving users internal floppy and hard-disk capability.

The disk storage system reportedly has a height of 5¼-in., a step time of 3 msec and a data transfer rate of 5M bit/sec.

It includes a soft-start motor and filtering system to reduce electronic noise, Percom said.

The Superior Interior is priced at $2,195.

Percom Data, 11220 Pagemill Road, Dallas, Texas 75243.

COGITO SYSTEMS CORP.
PT925 enhancement

Cogito Systems Corp. has enhanced its 25M-byte, half-height Winchester disk drive to provide a reported 37% increase in speed.

The enhanced PT925 features 25M bytes on two platters, using all four surfaces for storing data, according to Cogito Systems.

It also offers a dedicated head landing zone and three-axis shock mounts, said to be effective up to 40 g forces.

It also is said to include a band-driven stepper motor actuator operating in an open loop linear mode to achieve access time of less than 85 msec.

The drive is priced at $795, the vendor said.

Cogito Systems , 235 Zanker Road, San Jose, Calif. 95131.

PRINTERS/PLOTTERS/ PERIPHERALS

EXXON OFFICE SYSTEMS CO.
Exxon Ink Jet Printer

Exxon Office Systems Co. announced that its ink jet printer can now be used with the IBM Personal Computer and Personal Computer XT for high-resolution printing of graphics and text.

The Exxon Ink Jet Printer uses device driver software that is inserted into the operating system of the Personal Computer or Personal Computer XT. The printer is said to produce correspondence-quality print in a variety of type styles.

Users can choose to install up to eight resident fonts from a selection of more than 20 type styles, the vendor said. The device driver is said to permit the unit to print output from personal computer applications at speeds up to 90 char./sec.

Prices for the printer begin at $2,995. The device driver software costs an additional $95.

Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

BOARD-LEVEL DEVICES

THESYS MEMORY PRODUCTS CORP.
Fastfile

Thesys Memory Products Corp. has announced the Fastfile semiconductor memory system, featuring an access time of less than 0.25 msec and a data transfer rate of up to 1M byte/sec.

Fastfile has a built-in uninterruptible power supply and uses 256K-byte semiconductor memory chips. The chips feature single-bit error correction and double-bit error correction with parity checking on internal data transfers.

The product is intended to work in local-area networks and multiuser applications where it can reduce disk access time and the frequency of disk access, the company said.

The price for the 1.5M-byte storage capacity version of Fastfile is $1,795, and the price for the 5M-byte version is $3,495, according to the company.

Thesys Memory Products, 7345 E. Acoma Drive, Scottsdale, Ariz. 85260.

AST RESEARCH, INC.
Preview!

AST Research, Inc. has introduced Preview!, a monochrome display adapter board for the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Preview! reportedly offers bit-mapped graphics compatible with several business software packages, including Ashton-Tate's Framework and Lotus Development Corp.'s Symphony and 1-2-3.

Preview! is priced at $399, the vendor said.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

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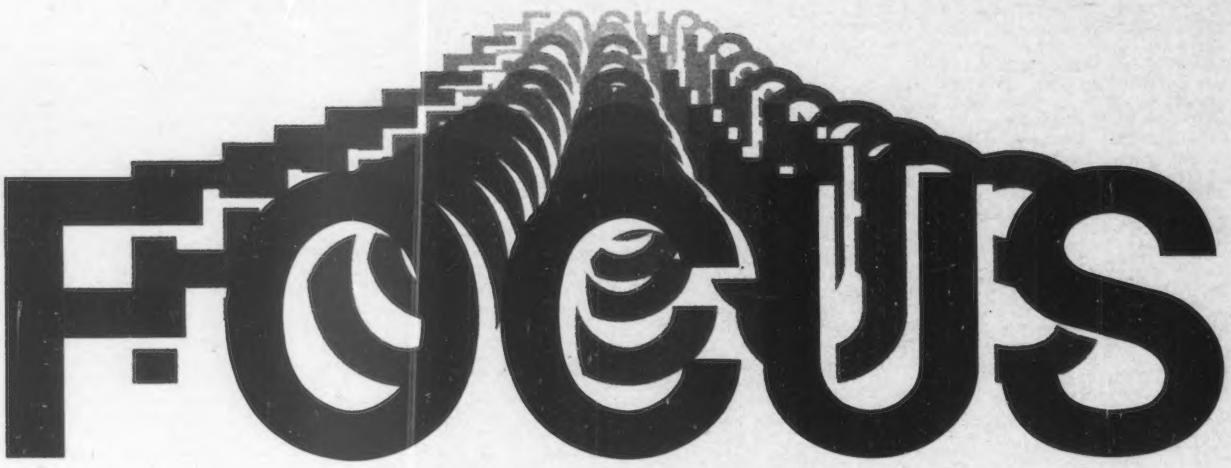

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COMPUTER INDUSTRY

STC third-quarter report details losses

LOUISVILLE, Colo. — Storage Technology Corp. (STC) posted a third-quarter loss of $64.7 million, according to its recently released financial report. The company's anticipation of that loss had earlier led it to file for protection under Chapter 11 of the Federal Bankruptcy Act.

The loss for the quarter, equal to $1.87 per fully diluted share, compared to a year-earlier loss of $6.9 million, or 20 cents per fully diluted share. For the first nine months of the current fiscal year, STC posted a loss of $86.2 million, or $2.49 per share; that figure included a tax benefit of $24.3 million. The company had reported a quarterly loss of $5.4 million, or 5 cents per share, in the comparable period in 1983.

STC actually posted a revenue gain for the third quarter, $282.2 million, compared to year-earlier revenues of $201.4 million; however, costs and expenses soared to $282.2 million, compared to $212.5 million in the third quarter last year. For the first nine months, revenues declined to $656.6 million, compared to $659.6 million last year, and expenses increased to $767.2 million from $664.6 million the previous year.

The third-quarter loss was compounded by federal tax adjustments for the years 1977 and 1978, the company said. Despite a pretax loss of $52.5 million, the company paid income taxes of $12.4 million.

Lower than expected shipments

STC attributed the financial problems to lower than anticipated shipments, higher costs for new products, lower margins due to price cutting and increased depreciation expenses on rental equipment.

Additionally, the company said that it had placed its Dublin subsidiary, Storage Technology Products B.V., into receivership. That subsidiary, employing 363 people and engaged in manufacturing products for the European market, was acquired in 1980 as part of the acquisition of Documation, Inc. STC said its facilities in the U.S. and Puerto Rico would supply the market formerly served by the Irish subsidiary.

Prior to the release of the financial report, STC Chairman Jesse I. Aweida met with company creditors and U.S. trustee Dolores Kopel. Aweida pledged the company's full cooperation and desire "to emerge from Chapter 11 as rapidly as possible with a reorganization plan acceptable to

See **STC** page 86

- Pansophic Systems, Inc. took aim at gaining a foothold in the high-end IBM mainframe software market with the recent acquisition of the developer of an online application generator/**78**
- Control Data Corp. announced its intention to sell off a financial subsidiary and focus more on the computer industry/**80**
- Lee Data Corp. will acquire Visual Technology, Inc., manufacturer of the Commuter portable computer, in a $16.8 million deal/**80**

INDUSTRY INSIGHT
David Olmos
CW Staff

Trade secret suits devastate firms

While not all trade secret lawsuits make splashy headlines like last year's IBM-Hitachi Ltd. case, such legal battles are being waged throughout the computer industry at terrific cost to the combatants. In some instances, the very survival of a company may be at stake.

Eagle Computer, Inc. and Franklin Computer Corp. are two recent cases in point. Eagle, a maker of IBM-compatible microcomputers, has been struggling to stay afloat ever since IBM slapped it with a patent infringement suit early this year. And Franklin, burdened by a $2.5 million settlement of a copyright infringement suit brought by Apple Computer, Inc., was forced into a Chapter 11 bankruptcy reor-

See **SECRETS** page 84

Xerox computer chief targets top of factory automation heap

By Kathleen Burton
CW West Coast Bureau

LOS ANGELES — Xerox Computer Services (XCS) President William Fello believes his profitable $100-million division of the Xerox Corp. will garner the lion's share of the lucrative factory automation software market by 1987.

Fello, who took over as XCS' president in April after serving as marketing vice-president, plans rapid growth for the division. Over the next two years, he will integrate Xerox office products with Xerox business systems products and increasingly target vertical markets. "By 1987, vertical software will be more profitable than our services, accounting for half our sales," he said.

XCS' first commercial product, a turnkey manufacturing system called the Xerox Business Management System (XBMS), was introduced last March. It is available on the IBM 4331, the IBM 308 mainframe and the IBM Personal Computer XT. The system's 23 business and manufacturing programs include decision support, computer-aided design/computer-aided manufacturing, engineering, manufacturing control, factory automation tools and a microcomputer-to-mainframe link.

The potential customer base for computer-based manufacturing tools is enormous, according to Fello. Only 5% of the nation's 45,000 small factories producing less than $10 million worth of goods annually have automated their businesses so far. "Most manufacturing plants in the U.S. are still untouched by computers, so computer-based manufacturing is still wide-open territory," he said.

Fello predicted that IBM would not challenge XCS' two-year lead in factory automation software. "IBM's a tough competitor," he said, "but both companies can coexist in this niche." According to Fello,

See **XEROX** page 88

In face of redoubled market competition, Cray boss optimistic

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc. Chairman John A. Rollwagen recently declared that his company will maintain its lead in supercomputers despite competition from the Japanese or possibly even IBM.

Two Japanese companies, Fujitsu Ltd. and Hitachi Ltd., have introduced their own supercomputers, but "there's nothing happening there that's going to knock us off the track," Rollwagen told the New York Society of Security Analysts recently.

"Cray has the lead at the moment, but it's a thin one. It can't afford to fall on one of its next-generation machines," said James C. Browne, professor of computer science at the University of Texas at Austin and chairman of a panel advising the U.S. Office of Science and Technology Policy on supercomputers.

Cray has the lead in producing multiprocessor supercomputers; the Japanese models are still single processor units, said Jack Worlton, a fellow at the Los Alamos National Laboratory, Los Alamos, N.M., who has evaluated tests of the Cray and the Japanese computers. He said the contest is a three-way race between competing technologies — emitter-coupled logic (ECL), gallium arsenide and Cmos semiconductor chips — and which one will win is not clear.

While IBM has not indicated that it will enter the race, Rollwagen's comments reflected concern that it will. About half of Cray's units go into IBM sites, and users transfer some of their engineering and research applications to the Cray machine. This delays the customer's need to upgrade his IBM mainframe, Rollwagen noted.

To stop this "leakage" of mainframe sales, IBM might be tempted to enhance its still-unannounced Sierra line or even offer its own supercomputer, Rollwagen said. "Cray is a tiny company, and I'd never say we can handle IBM. But if they come over to our turf, we'd give them a hell of a fight," he said.

Browne said the Hitachi and Fujitsu supercomputers are IBM-compatible, which puts pressure on IBM to enter the field. IBM cannot wait five or six years to develop its own entry if it finds Japanese units going into its customer sites, he added.

When the Cray-2 becomes available, the Minneapolis manufacturer will have the Japanese bracketed with high-performance, low-cost machines, Rollwagen added.

Half of Cray's components are supplied by Fujitsu; Rollwagen said his company assumes that any information they provide to Fujitsu's semiconductor division ends up in the hands of Fujitsu's computer division.

"Fujitsu tells us no, that is not so, that we are a valued customer," he told the security analysts. He said Cray officials have seen components in the Fujitsu VP 200 that they cannot buy from Fujitsu.

See **CRAY** page 83

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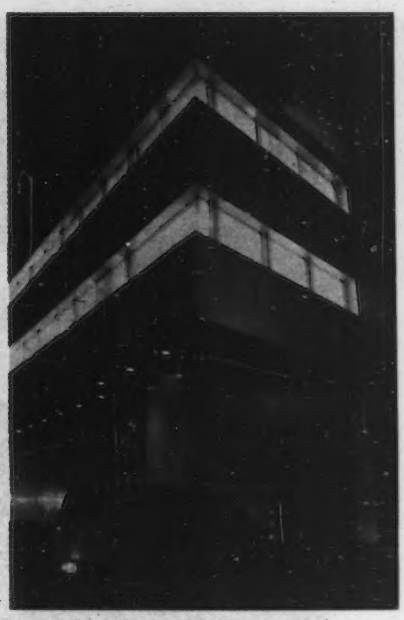

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High-tech industry needs to address Tax Reform Act;

OUTSIDE LINES
A.D. Saunders

Congress' approach to the Tax Reform Act of 1984 reveals major problems that must be addressed by the high-technology community.

First, on the issue of compensation and benefits, the act says a lot about too little and thereby makes compliance difficult because of the paperwork involved. Second, what the act does say often conflicts with other government policies designed to strengthen the ability of U.S. companies to compete on a global scale; and third, the act says nothing about software development accounting when something should have been said.

So many changes have been made that many high-technology companies will find it necessary to go back to the beginning and review all of their benefits via an audit. The crux of compensation and benefits tax policy is whether a benefit will be included as income to the employee or whether it will be deductible by the company as a business expense. Only an audit can pin down what is taxable or deductible and what is not: store discounts, tax preparation services for employees, dining and exercise facilities, parking, tuition reimbursement and the so-called cafeteria plans (which are not related to eating).

Another consideration in evaluating the impact of tax changes in compensation and benefits is whether the benefit is available to all employees or whether it is limited to key employees. The Tax Reform Act tends to favor democracy, so generally speaking, benefits available to all result in no tax to the employee. Certain perks which are usually restricted to senior personnel, such as interest-free loans and stock options, took a beating.

For example, under the old law, a portion of income from the exercise of incentive stock options is ordinary income, and a portion is capital gain. The new law increases the ordinary income amount for these stock options because, as Julia Bell, a tax lawyer with Gaston Snow & Eli Bartlett in Boston pointed out, although the long-term capital gain holding period was decreased in the Tax Reform Act generally, it was not decreased in the area of incentive stock options.

We hear so much adverse commentary about management compensation that we often overlook its real purpose: to attract top-flight people and reward their performance over time. In the high-technology world, being able to compete is as much a function of people as it is finances. Bill Bowman, chairman of Spinnaker Software of Cambridge, Mass., pointed out that a major obstacle has been that Congress "has no idea that stock options are as important and as widely used by small new companies" as they are by large companies like IBM.

Bowman testified at Congress' Joint Economic Committee's hearings and confirmed the fact that some members of Congress were thoroughly ignorant of the industry's views. Hopefully, Bowman said, the hearings will help revamp Congress' piecemeal approach and let them know that "stock options are an important way of life to smaller companies."

A golden parachute is a contract "to provide payments, contingent on a corporate takeover, often equal to several years compensation . . . [which are] deducted by the company as ordinary and necessary business expenses," according to an Ernst & Whinney (E&W) analysis of the Tax Reform Act of 1984.

Saunders is a Boston-based attorney with a practice which includes international marketing, antitrust issues and corporate finance.

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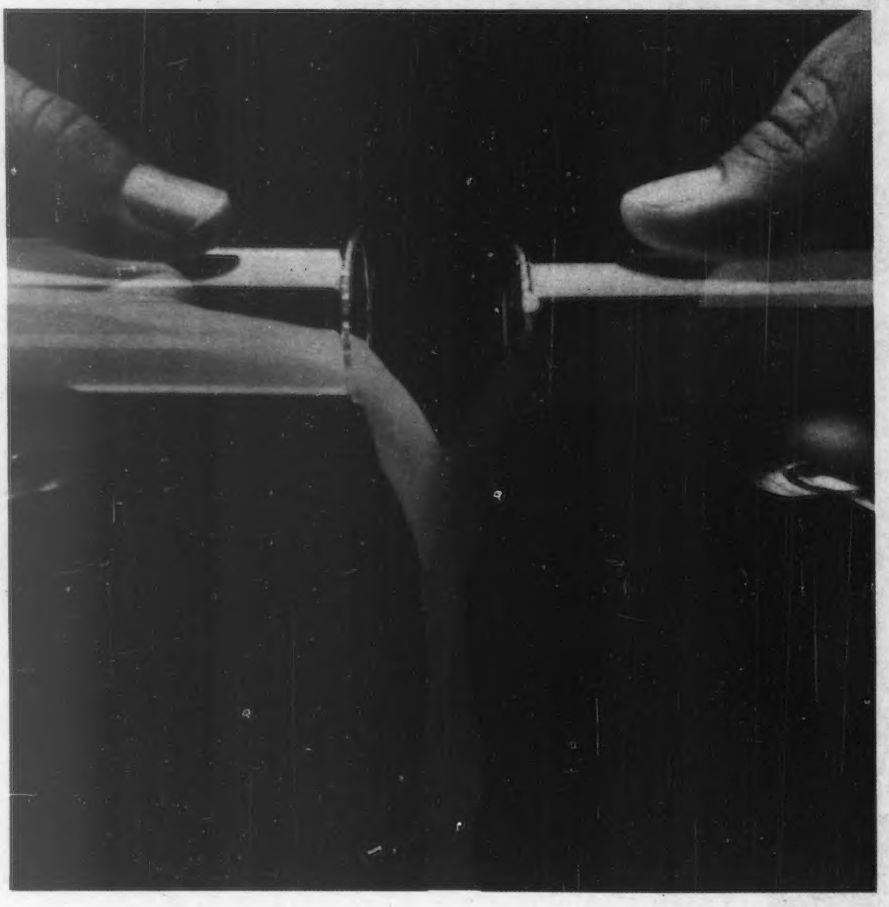

benefits, foreign tax, accounting issues raise concerns

According to E&W, excessive payments are now "presumed to constitute unreasonable compensation and are not deductible by the company. In addition, such payments are subject to [Federal Insurance Contributions Act] taxes, and a 20% nondeductible excise tax is imposed on the recipient."

There has been some talk of restructuring the golden parachute as a covenant not to compete. The payment would be for not doing something contrary to the competitive interests of the company as opposed to actually doing something for the company. The language of the Tax Reform Act makes the present value of the payment the test and not how that payment is otherwise characterized. So it is back to the drawing board for golden parachutes.

The Domestic International Sales Corp. (Disc) has new clothes. It is now called the Foreign Sales Corp. (FSC). The previously deferred Disc income, which would have been taxable under the old law at some unspecified time in the future, has been forgiven and becomes a permanent benefit to the tune of between $8 billion and $13 billion, according to George Yost of Coopers & Lybrand, Inc. The problem of the FSC is whether software will qualify as an export property for FSC purposes.

The new rules on withholding should help U.S. companies (and the U.S. Department of the Treasury) raise capital overseas. They obviate the need for international finance subsidiaries which were often incorporated in the Netherlands Antilles by U.S. companies as a way around the withholding problem. The withholding provision, however, has not come without its own baggage. Securities, bonds and other financial obligations purchased by foreigners are to be in "bearer" rather than "registered" form. The difference is important because of the anonomity they provide. The U.S. Senate feared losses to the public purse, believing only registered obligations, such as ones with the owner's names on them, could prevent tax evasion. The Treasury was in a quandary about what to do, but decided in late August to require money managers to certify that no purchaser is a U.S. citizen or resident. Bearer obligations stand, at least for now.

One of the very complex issues which international tax lawyers face is to determine whether the source of income is U.S. or foreign. If the income is U.S., then U.S. rates apply, but if the source is foreign, the company gets a credit against its U.S. taxes for payment of the foreign source income toward U.S. source income. The rules relating to these issues continue to "put U.S. companies at a competitive disadvantage" according to Jim Giarruso, Computervision Corp.'s vice-president for taxes.

Consider the transfer of intellectual property such as software to foreign subsidiaries. The Internal Revenue Service must now treat that transfer as a sale and will impose a tax. As Rob Langer, treasurer of Lotus Development Corp. pointed out, it was possible for many years to get an IRS ruling allowing the transfer to be tax free, but that route is "out the window now." The provision also has the potential for inflicting a significant tax liability. Since the transfer is a sale, whether or not there is profit, some corporate treasurers can outline a horrific red scenario in which up to a fourfold tax liability occurs as a result of the transfer.

ses voice/data integration.

The manufacturer of the first integrated voice/data switching system considers the issues.

Data is a major factor in office communications today. It's projected that within the next five years, data transmission will increase from the present 2% to 40% of total PBX traffic. That's explosive growth. And it means that companies must accommodate this increase by expanding their present systems or by planning now to replace obsolete systems with ones that can meet those needs.

A look at alternatives.

To keep pace with this change, an organization has two basic choices. First, it can stay with a limited voice-only PBX and create separate data networks. This, however, is a costly, inefficient method, and it becomes increasingly difficult to manage multiple expanding systems.

The second alternative is an integrated voice/data system. By installing one network, a company can have voice and data capabilities at every outlet.

Key benefits are the sharing of resources—devices and software—and consolidated network management. An integrated system is an investment in the future that can pay for itself in the savings of single network administration.

A definition of terms.

Integrated voice/data is sometimes thought of as simply combining voice and data in one switch. But it's really much more. It's the total integration of voice and data through a twisted pair network.

Because a digital system does not distinguish between voice and data, both look the same as they pass through the switch. So it's possible to apply sophisticated voice features to data—least cost routing, conference calls between workstations, callbacks on data terminals and other aids to productivity that are normally associated with voice-only systems.

Major considerations.

Universal Connectivity

One of the greatest challenges facing communications professionals today is the management of changing technology. In an environment where many approaches to office communications call for complete flexibility, only a system designed to be compatible with multi-vendor equipment is a safe choice. Such a system provides the format and protocol conversion capabilities for dissimilar devices to communicate with each other, freeing a company from the need to choose all its equipment from one vendor.

A system should be capable of connecting numerous dissimilar devices to a common network, allowing them to share peripherals, data and functions. This flexibile connectivity also protects your investment in equipment, ensuring its continuing value.

Non-Blocking Traffic

In voice systems, many calls can share one path through the switch because conversations are short and not everyone uses his telephone at the same time. However in data communications each device needs full access through the switch, and the long holding times of data calls place heavy demands on a network. As more data circuits are added to meet growing user needs, a system founded on voice-only design can't handle the traffic and begins to block calls from completion, or to degrade the quality of transmission.

Non-blocking matrix architecture, however, places no restrictions on voice and data access. As the data-to-voice proportions change, the system is reconfigured at the host controller. And there's no new cabling required. In non-blocking systems, savings are soon realized in simplified administration.

Processing Capacity and Speed

Many installed systems operate on 16-bit processors. While this may be adequate power for today's voice-only systems with few data options, it may not be sufficient for tomorrow.

Since a system's processors are the limiting factor, they must offer enough capacity for growth. A system offering 32-bit processors can handle both present and future capacity requirements. It's valuable insurance against obsolescence, with unlimited potential for applications like video and future developments.

The office automation industry is introducing more and more devices that operate at speeds up to 10 Mbps. Only an integrated voice/data system that offers 10 Mbps connectivity and integrated local area networking can successfully carry a company into the automated office environment now evolving.

A view for the future.

In 1979 InteCom introduced the first integrated voice/data system, the IBX™ Integrated Business Exchange, and since then has been setting the pace for the office communications industry.

The system has been proving its merits in installations all across the country for more than three years. It's backed by comprehensive support and refined through an ongoing program of research and development. Software-oriented, adaptive to new technology and protected from obsolescence, the IBX offers you the connectivity needed for tomorrow's automated office.

We hope this look at the issues of voice/data integration will be useful to you in your system selection. InteCom has met the communications requirements of companies in a wide range of industries. And today, our representatives are ready to help you evaluate your specialized needs.

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Pansophic buys out Christensen, acquires Telon

By David Olmos
CW Staff

BOSTON — Pansophic Systems, Inc. completed an acquisition earlier this month aimed at helping the company gain a foothold in the high-end IBM mainframe software market.

On Nov. 1, Pansophic acquired the remaining 85% of the assets of Christensen Systems, Inc. which it did not already own. Christensen, a three-year-old Quincy, Mass., software company, is the developer of Telon, an on-line application development program designed for IBM IMS-DC and CICS operating environments.

Pansophic, a $53-million system software supplier based in Oak Brook, Ill., until now, had no product targeted at the high-end IBM customer. The company hopes the Telon product will enable it to establish a strong position in large IBM shops.

Christensen

David Eskra, Pansophic president and chief operating officer, in a recent interview here said the company wants to gain a foothold in 8,000 to 12,000 of the estimated 33,000 IBM mainframe installations worldwide. Pansophic claimed its present customer base numbers 7,600.

"Telon will elevate Pansophic's reputation in those big IBM shops and will help us sell products at all levels of IBM shops," Eskra maintained. "It allows us to have a more consistent strategy at the customer level, and it allows customers to buy more than one Pansophic product at a time."

"We want to be the market leader," said Alfred Seyler, Pansophic's vice-president and managing director of on-line products. Seyler claimed that no clear market leader has yet emerged in the IBM IMS-DC and CICS arena, in which companies like Informatics General Corp., Cincom Systems, Inc. and Oxford Software Corp. are the major players.

Eskra

"We fully intend to dominate that market and to dominate it quickly," Seyler asserted.

Telon sells for about $100,000, or about twice as much as any previous product in the Pansophic line. Because Telon poses a different kind of marketing challenge, Eskra said, Pansophic, which has a worldwide sales force of 105 people, plans to establish a separate U.S. sales force for the product.

According to Don Christensen, founder and president of Christensen Systems, Telon had been installed at 37 IMS sites, accounting for sales of about $3 million prior to the acquisition. Christensen explained in an interview that his company has been weak in the marketing area and that it lacked the extensive marketing channels a major company like Pansophic can offer.

Eskra said the company plans to continue to expand its product line through acquisitions, while at the same time, placing increased emphasis on in-house research and development.

Last April, Pansophic paid $500,000 to acquire a 15% interest in Christensen Systems. It decided to exercise its option to acquire the remainder of the company for $2 million. As part of the deal, Christensen will also receive royalties for the sale of its products during the next five years.

The acquisition provides that all Christensen personnel will retain their present positions and responsibilities.

CEC to market S1 to Japanese

LAWRENCEVILLE, N.J. — Multi Solutions, Inc. announced recently it had entered into an exclusive five-year agreement with Computer Engineering and Consulting Ltd. (CEC) of Tokyo, for the licensing and distribution of Multi Solutions' S1 operating system to Japanese companies.

Subject to the approval of the Japanese government, the agreement provides that CEC must pay Multi Solutions minimum royalties amounting to about $40 million to maintain the exclusive worldwide rights to license and distribute the operating system and all related products to Japanese computer manufacturers, software designers and other vendors. Multi Solutions said CEC may renew the agreement for an additional five years, in which case CEC must pay additional minimum royalties of approximately $20 million a year for each of the five years.

The S1 operating system is a multiuser, multitasking system said to be capable of operating on almost any computer hardware.

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Comdisco reports year-end plunge in profits, posts record revenues

ROSEMONT, Ill. — Computer leasing and brokerage company Comdisco, Inc. recently reported profits of $29.7 million, or $1.05 per share, for the year ended Sept. 30. Year-earlier profits were $51.8 million, or $1.78 per share.

The company said the decline in profits was primarily due to decreased volumes of tax-advantaged transactions, which were suspended during an Internal Revenue Service investigation that was concluded early this year without adverse action being taken. In fiscal year 1982, the company reported profits of $29.3 million.

Despite the IRS review, Comdisco reported record revenues of $558.3 million for the year just ended, compared with $543.1 million last year.

For the fourth quarter of the year just ended, Comdisco reported profits of $8.9 million, or 33 cents per share, compared with year-earlier profits of $15.7 million, or 53 cents per share. Fourth-quarter revenues were $142.6 million, compared with $141.8 million in the previous year.

Kenneth N. Pontikes, chairman and president of Comdisco, said the company "expects a strong resurgence in financial services activities in fiscal 1985."

Data Access reorganization completed under Chapter 11

BLACKWOOD, N.J. — Data Access Systems, Inc., an independent distributor of personal computers, peripherals and supplies, recently announced the consummation of its plan of reorganization under Chapter 11 of the Federal Bankruptcy Act, as earlier approved by the U.S. District Court.

The company said it made cash payments totaling $5.5 million to creditors in partial settlement of allowed claims of approximately $35 million. It also issued to creditors $14.5 million of noninterest-bearing notes and 150,000 shares of its $100 par-value liquidating preferred stock said to be valued at $15 million.

Additionally, creditors received two million shares of common stock and warrants to purchase 400,000 more shares.

David Cohen, chairman and chief executive officer of Data Access, said that during the 20 months the company operated under Chapter 11 protection it "maintained and strengthened its fundamental business." Pointing out that the company recently achieved its first profitable year since 1978, Cohen added, "Now that the company is out of Chapter 11, it is in an excellent position to become even more profitable, and we feel it is on the threshold of a new period of growth."

The company reported revenues of $34.5 million for the year ended in August and said it has a $30 million tax loss carryforward that will enable it not to pay federal income taxes in the near future.

Verbatim trims domestic staff

SUNNYVALE, Calif. — Flexible storage disk maker Verbatim Corp. recently reported a staff reorganization resulting in the reduction of 175 of its professional and support staff at its U.S. locations — a 6% decrease in its worldwide work force.

The company had previously announced a restructuring of its operating divisions and said the reorganization was part of that restructuring.

The company said that no production employees were affected by the reduction whose purpose was to streamline the organization and improve the firm's ability to meet commitments to customers and overall objectives for sales and profitability.

Current production, product introduction and marketing schedules were not affected by the reorganization, the company said.

Vector Graphic earnings slide

THOUSAND OAKS, Calif. — Financially ailing Vector Graphic, Inc. recently posted a first-quarter loss of $1.8 million, or 24 cents per share, on a sharply declined revenue base.

Vector Graphic, which earlier had announced its intention to seek to be merged or acquired, saw its revenues decline to $2.1 million from year-earlier revenues of $6 million. The loss in the first quarter compared with a year-earlier loss of $701,000, or 12 cents per share.

The firm noted that in response to declining sales, it had previously reduced its work force by 66%, or roughly 100 employees. Expenses for the quarter were reduced to $4.1 million, compared with $7.2 million in the first quarter last year.

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CDC to sell credit company, acquires Visicorp subsidiary

MINNEAPOLIS — Control Data Corp. announced recently that it intends to sell its Commercial Credit Co. and related financial businesses. It was also announced that CDC had acquired Communications Solutions, Inc. (CSI) from Visicorp for approximately $5 million in cash.

The Commercial Credit unit was purchased in 1968 and served initially to finance CDC computer sales. CDC said it hopes to complete a sale by mid-1985 and focus more on its computer operations.

Profits at CDC have taken a decided downward turn for the first nine months of the current fiscal year to $600,000, compared with $113 million for the comparable period a year earlier.

The purchase of CSI follows an earlier move to acquire the rights to Visi On from Visicorp along with the absorption of the Visi On development team.

Robert Howell, director of business development for Control Data Software Co., said the acquisition addressed his company's focus on mainframe communications. CSI will operate as an autonomous unit of Control Data Software.

Lee Data to gain Visual Technology through stocks

MINNEAPOLIS — Lee Data Corp. will acquire Visual Technology, Inc. of Tewksbury, Mass., through an exchange of common stock valued at about $16.8 million, the two companies announced last week.

According to a preliminary letter of intent approved by the boards of directors of both companies, Lee Data will exchange one-half a share of its common stock for each share of Visual Technology's 4.9 million shares of common stock outstanding.

As a wholly owned subsidiary of Lee Data, Visual Technology will be operated by its current management, the companies said. Thomas R. Foley, president and chief executive officer of Visual Technology, will become an officer of Lee Data and a member of its board of directors, according to the planned merger.

Visual Technology, a manufacturer of asynchronous terminals, the Commuter portable computer and the Visual 2000 multiuser system, is expected to have its credit facility increased from $19 million to $22 million and, on completion of the merger, to $25 million, with the additional $3 million guaranteed by Lee Data. Additionally, Lee Data will make $3 million of additional financing available to Visual Technology, according to spokesmen.

Lee Data's sales force will market Visual Technology's products, the spokesmen said.

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Firm's president indicted for chip trade violations

By Charles Babcock
CW New York Bureau

NEW YORK — The president of International Processing Systems GmbH, a West German firm, was recently indicted by a federal grand jury here for conspiring to smuggle semiconductors to North Korea.

Babeck Seroush was indicted on six counts of violating the Trading with the Enemy Act, with a possible penalty of 10 years' imprisonment and a $50,000 fine on each count, according to Rudolph W. Giuliani, U.S. attorney for the Southern District of New York.

Without informing companies of their destination, Seroush attempted to purchase the following parts, according to the indictment: 10,000 pieces of National Semiconductor Corp. part MM 54C373J; 6,000 pieces of Texas Instruments, Inc. part number SN 54LS154; and 4,200 hybrid integrated circuits designed as components for night vision goggles. All were designed for use at the temperature extremes required for military applications, Giuliani said.

Bound for North Korea

The parts were slated to be shipped to International Processing Systems in Cologne, West Germany, where they would be diverted to North Korea, according to the indictment.

Companies that were approached by Seroush included: Analog Devices, Inc. of Norwood, Mass.; Jaco Electronics, Inc., of Hauppage, N.Y.; Kemet Capacitors of Union Carbide Corp., Tarrytown, N.Y.; and Schweber Electronics of Westbury, N.Y.

Seroush, a 38-year-old Iranian national, until recently had homes in Westport, Conn., and New York as well as Germany. He has been arrested by German authorities for possible extradition to the U.S. to stand trial, Guiliani said.

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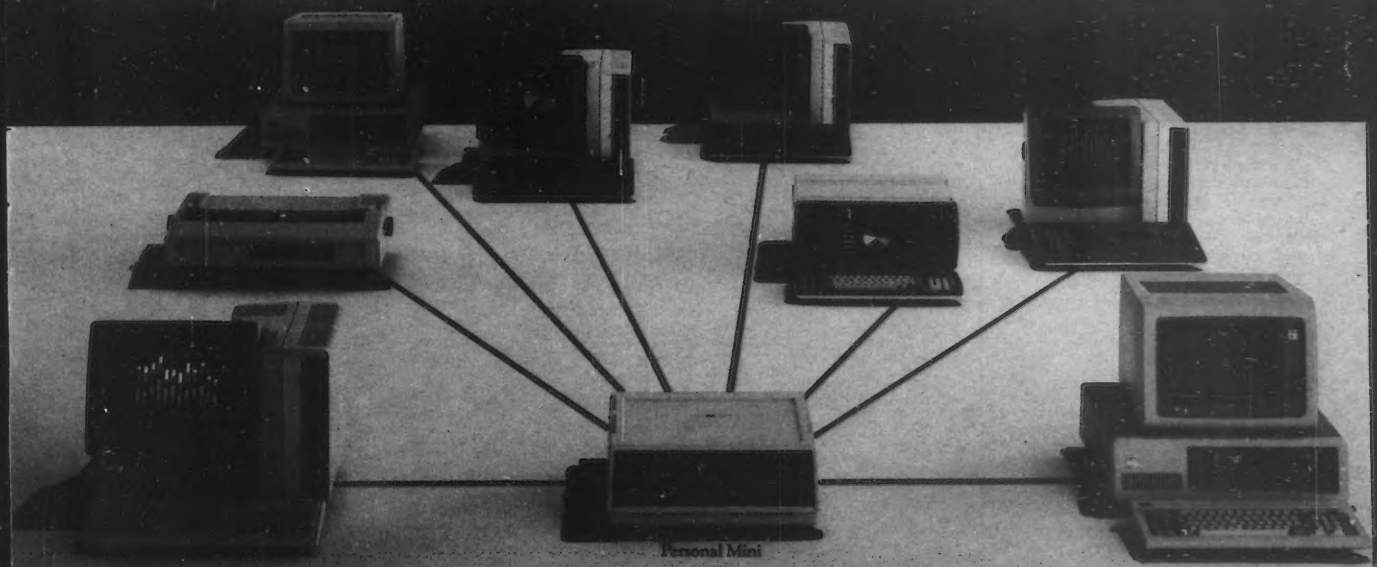

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Tandem doubles revenue with help from tax break

CUPERTINO, Calif. — Tandem Computers, Inc. recently reported that its fourth-quarter profits more than doubled to $21.6 million, or 53 cents per share, from $8.7 million, or 21 cents per share, a year earlier.

The company's profits were boosted by a one-time gain of $9.7 million, or 24 cents per share, resulting from a change in the tax law governing overseas operations.

Revenue for the quarter ended Sept. 30 increased 30% to $153 million, compared with $117.8 million during the same period one year earlier.

For fiscal year 1984, Tandem's revenue rose 27% to $532.6 million from $418.2 million during fiscal 1983. Profits for the year, including the $9.7 million tax benefit, were $42.9 million, or $1.04 cents per share, compared with $30.8 million, or 76 cents per share, the previous year.

James G. Treybig, president and chief executive officer, said sale of the company's high-end Nonstop TXP computer system, which was introduced last year, was the major contributing factor to revenue growth.

Nonrecurring items boost PE quarterly sales income

NORWALK, Conn. — Perkin-Elmer Corp. recently reported that first-quarter profits were $17.5 million, or 39 cents per share, compared with $8.8 million, or 20 cents per share one year earlier.

The profits included nonrecurring items that increased profits by $4 million, equivalent to 9 cents per share, and the company said profits without those items would have been $13.5 million, or 30 cents per share, a 53% increase over the same period on year earlier.

Sales revenue for the quarter ended Oct. 31 was $286 million, a 14% increase over the previous year.

Horace G. McDonell Jr., president and chief executive officer, said the company held the rate of increase in operating expenses below that of sales increases and the company experienced increases in new orders as well as in its backlog of unfilled orders.

Sales for the company's Data Systems Group were $60.2 million, up from $53.6 million a year earlier, and Semiconductor Equipment Group sales were $66.2 million, up from $49.4 million during the same period one year earlier.

Paradyne posts profit increase

LARGO, Fla. — Paradyne Corp. recently reported a 51% increase in third-quarter revenue and a 285% profit increase compared with the third quarter a year earlier.

Revenue for the three months ended Sept. 30 was $76.1 million, compared with $50.3 million a year earlier. Profits for the quarter just ended were $3.1 million, or 14 cents per share, compared with year-earlier profits of $804,000, or 4 cents per share.

Robert S. Wiggins, chief executive officer of Paradyne, expressed pleasure with the company's revenue and order rates during the third quarter but noted that "the international order rate appeared to be dampened by the effect of the strong dollar abroad."

EXECUTIVE CORNER

Jerome Meyer will join Varian Associates, Inc. in the newly created position of president and chief operating officer on Dec. 3.

■

Jonathan Yu has been appointed president and chief operating officer at Applied Micro Circuits Corp. Yu previously had been employed at TRW, Inc. and Burroughs Corp.

■

Frank Zurcher has been named president and chief executive officer of Molecular Computer, Inc.

■

W. Kyle Willis, who recently joined TCS Software, Inc. as chief financial officer, has been appointed president and chief executive officer of the company.

■

F. William Stamper has been appointed president of the MDS Systems Divison at Mohawk Data Sciences Corp. (MDS). Prior to joining MDS, Stamper worked for Control Data Corp.

■

William Porter has been appointed to president, chief operating officer and member of the board of direc-

See EXEC page 84

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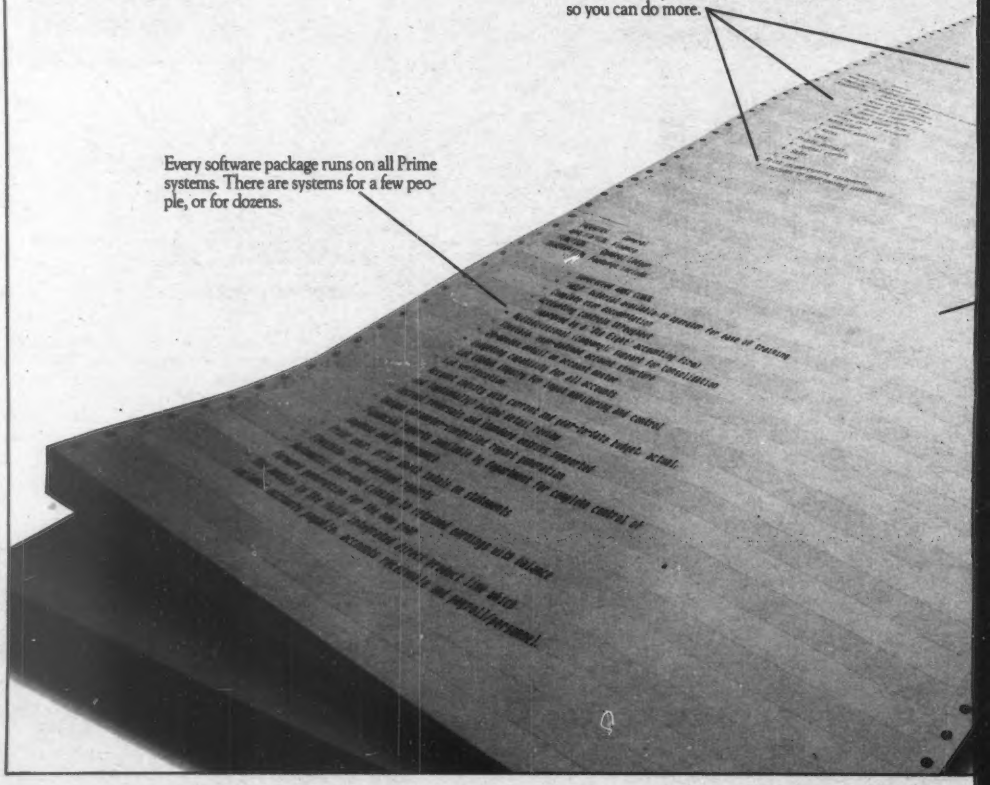


Cray Research sales up despite increased competition

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc.'s sales are increasing at a time when it faces growing supercomputer competition at home and abroad.

Cray Chairman John A. Rollwagen told the New York Society of Security Analysts recently that the Minneapolis-based supercomputer maker expects to install 21 multimillion-dollar systems in 1984. Last year it installed 16; next year it expects to install 30, Rollwagen said.

"If someone orders today, we have to say, 'Sorry, but we can't deliver until the first quarter of 1986, 15 months from now,' " he said.

Expects orders to grow

Still, the pace of orders is expected to grow, Rollwagen said. Forty-five prospects have submitted a written or verbal order for a Cray machine, and 24 of those ordering are new customers. New customers make up almost three-fourths of the prospects that are currently querying Cray, he added.

When asked if Cray, which is used to selling a handful of $6.5 million to $20 million machines a year, could ramp up production, Rollwagen answered by noting that in the past, Cray customers have been reluctant to say they would be willing to buy a new model three years down the road, so Cray forecasters would say demand was likely to decline in three years.

Now, Cray "is taking the courageous step" of predicting that demand will remain steady, rather than decline, and it is increasing production accordingly, he said.

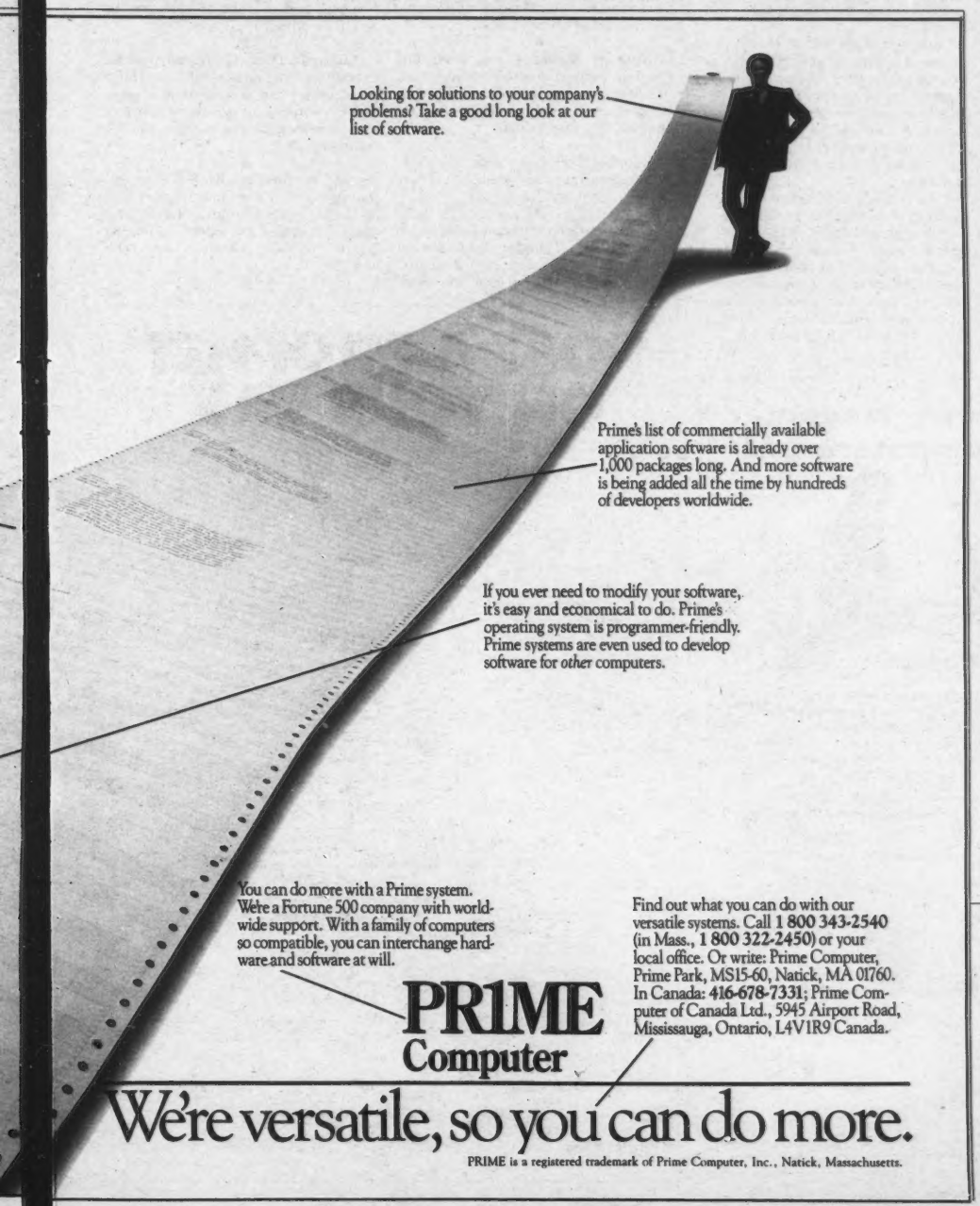
While the bulk of Cray's customers continue to be government and university laboratories, Rollwagen said a growing share are commercial companies, such as the Ford Motor Co., which uses a Cray machine to simulate auto crashes.

Demand strongest for multiprocessor units

Rollwagen indicated that the demand is strongest for its X-MP/2 or X-MP/4 dual and quadruple processor units. "We misjudged to some extent the demand for the top of the line," he said.

He noted that the appetite for supercomputing power is driven by the desire to simulate physical phenomena, such as aircraft flying or atmospheric conditions.

John F. Carlson, Cray's chief financial officer, reported that the company garnered a revenue of $71.6 million and net earnings of $19.6 million, or $1.32 per share, in the third quarter ended Sept. 30. Revenue in the third quarter last year was $31.4 million, with a net income of $2.8 million, or 19 cents per share.



CRAY from page 73

They worry that they will not get the most advanced components until two years after they have appeared in Japanese computers. Cray has developed its own gallium arsenide manufacturing capability to avoid becoming dependent on its competitors, according to Rollwagen; its first attempts have not yielded wafers with working chips.

Japanese may have edge

Browne said taking the step to gallium arsenide components was risky, adding that the Japanese may have an edge in designing gallium arsenide chips.

A start-up company, ETA Systems, Inc. of St. Paul, Minn., an offshoot of Control Data Corp. of Minneapolis, is designing a supercomputer with Cmos chips that are slower than ELC or gallium arsenide but contain a very high density of components per chip. The chip is being designed to execute 10 billion floating-point operations per second and is scheduled to be available in the second half of 1986, ETA spokesmen said.

Rollwagen claimed Cray had a two-year lead on Hitachi and Fujitsu because the Japanese firms were still field-testing their new models and needed more time to develop them. Spokesmen for Fujitsu and Hitachi America Ltd. disputed the claim, saying they were past field-testing and were installing units at locations in Japan.

Amdahl Corp. of Sunnyvale, Calif., which markets Fujitsu supercomputers in the U.S. as the Amdahl 1100 and 1200, said they will be available in the second quarter of 1985. Hitachi has not decided yet whether it will market its S-810 and S-820 supercomputers in the U.S., Hitachi spokesmen said.

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SECRETS from page 73

ganization last June.

In a book to be published next month, Palo Alto, Calif., attorney Robert Spanner likens trade secret litigation to "an excursion into the realms of hell." In a recent interview with *Computerworld*, Spanner, a trade secret specialist with Beckford, Spanner & Kelley, described the "devastating" costs that often result when a computer company gets involved in trade secret lawsuits.

Trade secret cases, Spanner said, "consume the attention and passions of management and are amazingly disruptive [to] the operations of the company." He said the damage can be particularly severe for a start-up company that is hit even by the threat of a lawsuit. Even if the start-up is able to defend against the charges successfully, the financial and emotional costs may doom the planned venture.

"One very important strategic consideration," Spanner noted, "is that as soon as word gets out to the stock market that there is a trade secret litigation instituted or threatened, [investors and customers] will avoid you like the plague."

Spanner said he believes trade secret litigation is on the increase in the computer industry. He said he counsels his clients to avoid such lawsuits "at all costs."

In his book, Spanner writes that one of the stickiest areas of trade secret law is differentiating between proprietary information, which a company's employee — in signing a nondisclosure agreement — promises not to reveal should he leave the company, and the employee's general knowledge and experience, which he is free to use as he wants.

"Courts have had a great deal of difficulty in differentiating an employee's knowledge from company proprietary information," he said. Spanner said that judges are sometimes uncomfortable with these suits because of the "fundamental considerations of personal autonomy involved." A judge must weigh such factors as the use of information that exists in the privacy of an individual's thoughts and an employee's freedom to move from one job to another and to better himself economically, he noted. There are, of course, important economic interests at stake, too; for example, promoting U.S. R&D to help the country's competitive position vis-a-vis foreign companies.

Spanner believes that trade secret law is in a state of general disarray. "Cases presenting similar circumstances are being decided in diametrically opposite ways," he maintained. He would like to see state legislatures consider this complex issue and adopt some kind of uniform statutes.

"It's important to prevent and avoid cynicism on the part of the public with any facet of the law," Spanner said. "I think the word is going to get out that there is no predictability in the trade secret area, and that it depends on who the judge is and whether he likes you. I think that is socially dangerous."

EXEC from page 82

tors at Startel Corp.

■

Nancy Goodhue was named vice-president of Datatel Minicomputer Co.

■

William Morgan has been promoted to the newly created position of senior vice-president of product operations at Memorex Corp. Prior to working at Memorex, Morgan was employed by Texas Instruments, Inc.

■

Louis Clark has joined Integrated Planning, Inc. as vice-president of product development.

■

Honeywell, Inc. announced the following promotions to group vice-presidents: **Charles Johnson**, large computers and manufacturing systems; and **Eugene Manno**, small computers and office systems.

■

Andrew Knowles has been appointed corporate vice-president at Prime Computer, Inc. Knowles previously worked for Lexidata Corp. and Digital Equipment Corp.

■

George Perlegos, vice-president of engineering, has resigned from Seeq Technology, Inc.

■

Lee Data Corp. announced the appointments of **Douglas Pihl**, senior vice-president of corporate development; and **Don Miller**, vice-president of product development.

■

James Hart has been appointed to the newly created position of senior vice-president and chief operating officer at Avanti Communications Corp.

■

Edward F. Eddy has resigned his position of vice-chairman at NEC America, Inc. to join Ambi Corp. as chairman.

Stephen S. Yau was elected president of the American Federation of Information Processing Societies following the National Computer Conference this past summer. **Per A. Holst** was named vice-president, **Herbert B. Safford** was named secretary, and **Rolland B. Arndt** was named treasurer of the federation. Yau is a professor and chairman of the Department of Electrical Engineering and Computer Science at Northwestern University.

■

Victor D. Poor has resigned as an executive vice-president of Datapoint Corp. and will become a technology consultant to the chairman and chief executive officer of the company.

■

Donald W. Gouldsmith has been appointed to the position of president and chief executive officer at Madic Corp. Former president **Richard Wilke** becomes chairman of the board.

■

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COMPUTER INDUSTRY

MERGERS AND ACQUISITIONS

Avant-Garde Corp. announced recently it has reached an agreement in principle to acquire 100% of the common stock of **Human Engineered Software Corp.** (HES). HES will become a wholly owned subsidiary of Avant-Garde.

Final settlement will depend on Avant-Garde reaching a conclusive agreement with HES' principal secured lender. HES last month filed for relief under Chapter 11 of the Federal Bankruptcy Act. The bankruptcy court must also approve an HES plan of reorganization.

■

Anacomp, Inc. announced that the board of directors of its majority-owned subsidiary **USA Communications, Inc.** has approved an agreement in principle for the sale of substantially all of the assets of USA Communications to **Outlet Communications, Inc.**, a wholly owned subsidiary of the Rockefeller Group, a private company owned largely by the Rockefeller family.

The $22 million cash sale is subject to the execution of a definitive agreement and necessary USA Communications stockholder and regulatory approvals. On a fully diluted basis, assuming exercise of all outstanding warrants and options and the retirement of USA Communications' retained liabilities, the purchase price is equivalent to approximately $3.10 per share of USA Communications common stock. Anacomp owns 2.4 million shares of USA Communications common stock.

■

Bell & Howell Co. announced that it has agreed to purchase certain assets of **3M Co.'s** computer-output microfilm (COM) business. A COM system electronically transfers data from a computer directly onto microfilm instead of paper and is the most economical computer data storage method available.

■

Honeywell, Inc. and **Digital Datacom, Inc.** have announced that they have signed an agreement providing for a merger whereby Honeywell will acquire Digital Datacom, a Laguna Niguel, Calif., maker of work center manufacturing systems, for $10 million in cash. The two companies had signed a memorandum of understanding in August.

■

Data I/O Corp., Redmond, Wash., and **Futurenet Corp.**, Canoga Park, Calif., jointly announced that they have entered into a definitive agreement associated with the Data I/O's acquisition of all of Futurenet's outstanding shares in exchange for 2.16 million shares of Data I/O common stock, which had been announced in late August.

The acquisition will be accomplished through the merger of a Data I/O subsidiary and Futurenet and will be considered a pooling of interests. The transaction is conditioned upon certain regulatory filings and approval of Futurenet's shareholders.

■

MSI Data Corp. entered into an agreement in principle to acquire **Azurdata, Inc.** of Redmond, Wash., for an undisclosed amount.

Completion of the transaction is subject to execution of a definitive agreement that must be approved by the boards of directors of both companies and by the Azurdata stockholders.

■

NCA Corp. announced it has agreed to acquire **The Systems Practice, Inc.** for an undisclosed amount of NCA common stock. Terms of the acquisition were not available.

SUPERSHORTS

Miniscribe Corp. has signed an agreement with **Arrow Electronics, Inc.** to distribute Miniscribe's entire line of Winchester disk drives. Lawrence J. Klassen, vice-president of marketing at Miniscribe, said the contract is a multiyear agreement with a potential value in excess of $20 million.

■

AT&T Information Systems and **The Computer Store, Inc.** announced an agreement whereby The Computer Store will market the AT&T personal computer and accessories in their 12 stores located in New England and the mid-Atlantic states. Terms of the agreement were not available.

■

Relational Technology, Inc. and **Burroughs Corp.** signed an OEM pact granting Burroughs the right to distribute Relational's Ingres relational data base management system with its new supermicrocomputer. Terms of the agreement were not available.

■

Savenet, Inc., CP National Corp., American Network, Inc. and **Pacific Telecom, Inc.** announced they have reached agreements in principle for the merger of the discount long-distance telephone services of Savenet and CP National's passport operations into American Network, a publicly held company. The agreements are subject to the approval of the boards of directors of all companies. The transaction is expected to be completed by late November.

■

Stratus Computer, Inc. announced the formation of two key corporate departments intended to enhance further the company's ability to deliver advanced products.

Hardware and software development have been consolidated into a single engineering department. A newly created group focused on emerging technologies and business opportunities also has been formed.

■

Charles River Data Systems announced an agreement worth an estimated $5 million to deliver 275 of its Universe 68 computer systems and Unos operating system software to the People's Republic of China over the next 18 months. At the same time, the company received a specific contract to ship the first $1 million worth of hardware and software.

■

Ferox Microsystems, Inc. announced the formation of a new division called **Ferox Information Systems** (FIS). Lead by Dr. Timothy Hallinan, FIS will develop a series of products to present a range of business, social, economic and financial statistics in a concise format on single diskettes.

■

Vitalink Communications Corp. and **Digital Equipment Corp.** announced an agreement under which the two companies will cooperatively market a hardware and software product called Translan that transparently connects local-area networks via satellites and/or terrestrial lines.

The agreement calls for Vitalink to receive a technology license from DEC as well as cooperatively market Translan with DEC. Translan will be sold, serviced and supported by Vitalink.

■

Ashton-Tate announced it has signed a $10 million contract with French software distributor **La Commande Electronique** to distribute Ashton-Tate's current business software products in France. Terms of the agreement were not disclosed.

■

Visual Technology, Inc. announced that it will be moving its New York printed-circuit board assembly operations to its principal manufacturing facility in Massachusetts. Work force reductions will result in the termination or layoff of approximately 190 employees, primarily in New York.

See **SUPER** page 89

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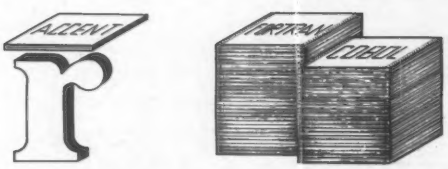

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STC from page 73

shareholders, creditors, employees and customers."

The meeting was called by the trustee to form a creditors committee to review and make recommendations on the company's financial plans as part of the court-monitored reorganization. At the time of that meeting, the company announced the filing of a petition to place another subsidiary, Media Technology Corp., under Chapter 11 protection for reorganization.

Aweida told the creditors the company expects to emerge from reorganization as a "stronger, possibly smaller, but more competitive operation." He said the company is optimistic about its core business of providing storage tape and disk products and is excited about its optical disk products.

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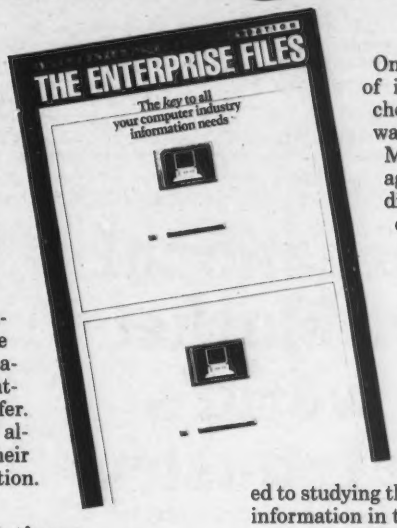

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5 NICKELS AND DIMES

Computer Sciences Corp. reported profits for the second quarter ended Sept. 28 were $3.4 million, or 25 cents per share, compared with $4.4 million, or 32 cents per share, for the year-earlier period. Revenues were $172 million, compared with $184.4 million in the corresponding period last year.

The lower profits resulted primarily from an expected decrease in international revenue and higher interest expenses, due to bank borrowings, according to William Hoover, chairman and president of Computer Sciences.

■

Masstor Systems Corp. announced that revenues in the third quarter ended Sept. 30 increased to $6.1 million, compared with $4.8 million in the comparable period one year ago. Net loss for the quarter was $3.8 million, or 24 cents per share, compared with a net loss of $3.2 million, or 22 cents per share, in the same quarter last year.

■

Stratus Computer, Inc. reported revenues for the third quarter ended Sept. 30 were $11.1 million, an 87% increase from $5.9 million in last year's quarter. Profits were $1.5 million, or 8 cents per share, compared with $695,000, or 4 cents per share, in the corresponding period one year ago.

■

Zentec Corp. announced revenues for the third quarter ended Sept. 29 of $6 million, compared with $5.4 million for the same period one year earlier. Profits were $101,000, or 3 cents per share, compared with a net loss of $950,000, or 28 cents per share, in the same quarter last year.

■

Keane, Inc. reported profits for the third quarter ended Sept. 30 of $169,000, or 19 cents per share, up from $8,000, or 1 cent per share, a year ago. Revenues were $8.9 million, up 72% from $5.1 million for the same quarter one year earlier.

■

Cray Research, Inc. announced revenues for the third quarter ended Sept. 30 were $71.6 million, compared with $31.3 million in the same period a year ago. Profits were $19.5 million, or $1.32 per share, compared with $2.8 million, or 19 cents per share, for last year's quarter.

U.S. factories not prepared for automation

LOS ANGELES — American business may not be ready for factory automation, in the view of William Fello, president of Xerox Computer Services, a division of Xerox Corp.

"Factory automation," he said, "can expose serious production problems that must be attacked with quality-control methods that aren't yet available in the U.S." Factory automation, because it lets vendors control manufacturing and costs, is critical if the U.S. is to compete successfully with Japan, he noted.

Based on computer-integrated manufacturing, Fello thinks the factory of the future will include decision support, materials planning and control, computer-aided design and manufacturing and factory automation programs stored in a central data base. Driving toward a zero inventory environment that is based on a model now operative in Japan, the factory will encompass "just-in-time delivery," which will make warehouses obsolete by delivering inventory to the factory floor as needed.

Fello said Xerox's Marathon copier plant in Venray, the Netherlands, is a factory automation success story. The plant implemented the Business Management System almost two years ago and has reduced inventory and cut systems costs by 50% and saved 60% by eliminating inventory rush charges and late penalties.

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XEROX from page 73

IBM has chosen to set the hardware standard in manufacturing systems, with a technical hardware umbrella covering everything from the 4361 to a serial OEM interface to a workstation adapter for factory robots.

Personal computer spreadsheets and vertical agricultural programs are easier niches for IBM to target than complex factory automation programs like material requirements planning, he said, which require support from processing, routing, production, inventory control and purchasing systems.

IBM presently offers only a skeleton of a modern manufacturing system, Fello said. XCS' manufacturing software has two advantages over IBM's, he claimed: It takes up half the space on the mainframe and is easily upgraded, which allows small companies to upgrade with hardware that ranges from networked terminals to IBM's 3084 turnkey system.

IBM's factory automation strategy will use its Personal Computer as a basic building block, Fello predicted. "IBM will corner the market with [its] 370 architecture on single- and multiple-station desktops," he said.

XCS' relationship with Xerox offers the best of all possible worlds, Fello said. The disadvantage to the relationship, however, is XCS' close connection to Xerox Corp.'s copier image, he added.

SUPER from page 86

Bolt, Beranek and Newman, Inc. (BBN) reported its **BBN Communications Corp.** subsidiary has received a contract for a private wide-area data communications network from **Olivetti, S.P.A.** for their customer **Snam.** Snam is a unit of the ENI Group, Italy's $25 billion energy corporation.

The contract is for packet-switching hardware and software. The network will link terminals in 180 cities throughout Italy with 26 ENI computer centers.

■

VLSI Technology, Inc. (VTI) and **Lattice Semiconductor Corp.** jointly announced the signing of a technology and product cross-licensing agreement.

Under the agreement, VTI will receive alternate sourcing rights for very high-performance, electronically erasable programmable read-only memories, static random-access memories and programmable logic devices in development by Lattice.

In exchange, VTI will provide Lattice with wafer fabrication, assembly and test capacity, product engineering and equipment leasing support. Both companies will support joint product development and future product cross-licensing.

■

Matsushita Electric Corp. of America has named Stephen S. Ingersoll, former U.S. ambassador to Japan, as the chairman of a new $10 million foundation to promote education in the U.S.

The foundation will rank in the top 25% of U.S. corporate foundations, according to the "Foundation Directory," and is the largest foundation established by a Japanese company in the U.S.

■

Philon, Inc. has acquired rights to a data base management system developed by the California-based **MAG Software, Inc.** This agreement also includes the development of proprietary enhancements for future Philon product offerings.

■

National Intergroup, Inc. announced that it has formed a wholly owned information services subsidiary named **Genix.** Genix will offer software sales, computer consulting services and remote computer services from National Intergroup's modern computer data center in Pittsburgh.

The subsidiary will be operated by Raul Pupo, president; Joseph Murphy, vice-president of operations and technology; and John Kelly, vice-president of finance.

■

Verbex, a division of **Exxon Corp.,** and **Lear Siegler, Inc.'s** instrument division announced that they have signed a license agreement that transfers Verbex's continuous speech recognition technology to Lear Siegler.

Under the terms of the agreement, Lear Siegler has access to Verbex's Model 3000 proprietary continuous speech recognition technology. Lear Siegler's license permits it to use the Verbex technology to supplement its extensive development in voice recognition products for military and commercial aircraft instrument/avionics systems as well as military land and amphibious vehicle controls.

■

The **Paxnet** local-area network software system, introduced last year by Phoenix Software Associates, Ltd., has been sold to **Vianetix, Inc.** of Boulder, Colo. Vianetix will market the software under the name Vianet.

■

Scientific Micro Systems, Inc. (SMS) has announced a second-source agreement with **Data Technology Corp.** (DTC). The agreement licenses DTC to manufacture and sell the SMS Omti Series 5000 and Series 6000 SCSI controller boards and to purchase and resell the SMS Omti Series 5000 controller chip sets.

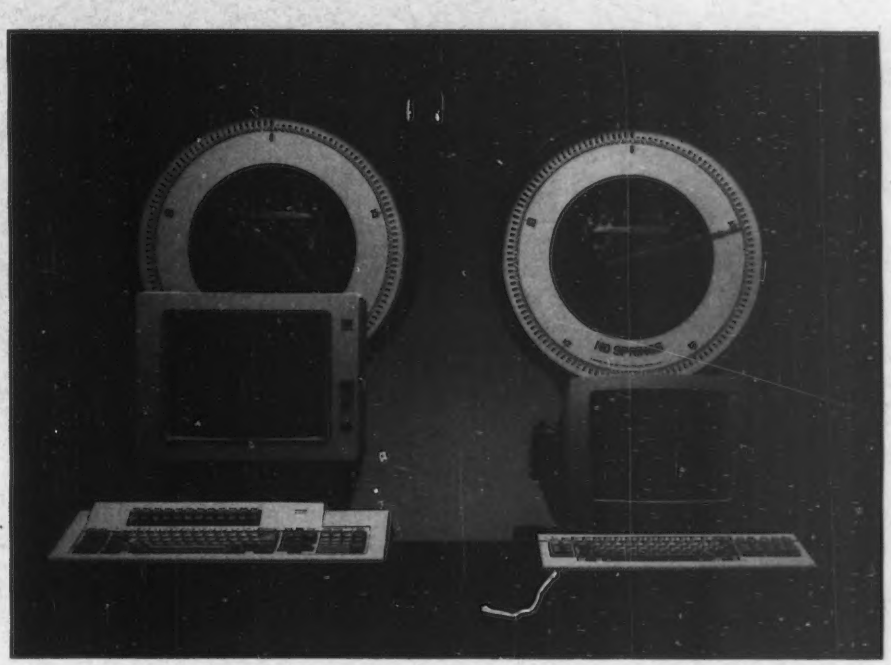
■

NEC Telephones, Inc. and **Compath National** announced the signing of a two-year agreement in which Compath has been awarded nationwide distribution rights to market the Neax 2400 information management systems product line.

■

Micronix Corp. announced it has signed a patent cross-licensing agreement with **AT&T.**

The agreement states that Micronix and AT&T may each use present and certain future patents relating to lithographic manufacturing equipment. It includes patents developed by AT&T and Micronix for implementing x-ray lithography.



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The Product Developers are the backbone of the Technical Development and Support Department. Their expertise is relied on for new product development and product maintenance. We are currently looking for Product Developers to work on our **CICS, IMS-DC, and File-AID** products. The qualifications for these positions are:

- **CICS** - This individual will assist the CICS team to develop new enhancements to our current products and maintain these systems. A thorough understanding of CICS is necessary.
- **IMS-DC/VTAM** - This person will provide our group with the expertise in VTAM or IMS-DC to bring a new product to market.
- **File-AID** - This individual will contribute to the File-AID team by assisting them to develop and maintain the File-AID product line. A good understanding of OS and MVS systems, data management and file systems is necessary along with a thorough comprehension of ISPF/PDF.

PRODUCT SPECIALISTS

The Product Specialist is the sales/technical interface of the Products Division. Their primary responsibility is to provide the sales staff with the tools that are necessary to sell our products and to provide our customers with the training and support they need to use our products. Indepth knowledge of programming environments and our products is essential. Specific areas of concentration are:

- **DOS** - Our involvement in the DOS marketplace is always increasing. Due to this expansion, we require an individual that understands the DOS environment to assist our sales staff and development team market our products and further improve our presence in the marketplace.
- **File-AID** - This product has expanded so rapidly that we need to add another Product Specialist to our staff. This individual will possess excellent presentation skills and a thorough knowledge of ISPF/PDF.

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The Product Support Representative's purpose is to supply the highest level of professional and technical assistance to **Compuware's** customers and sales staff. Specific areas of expertise that we are looking for include:

- **CICS** - This individual will assist our team to support our customers and sales staff in the use of our CICS product line.
- **GENERAL SYSTEMS** - This individual will provide support to our customers in a variety of areas. We are looking for an individual with a good systems background.

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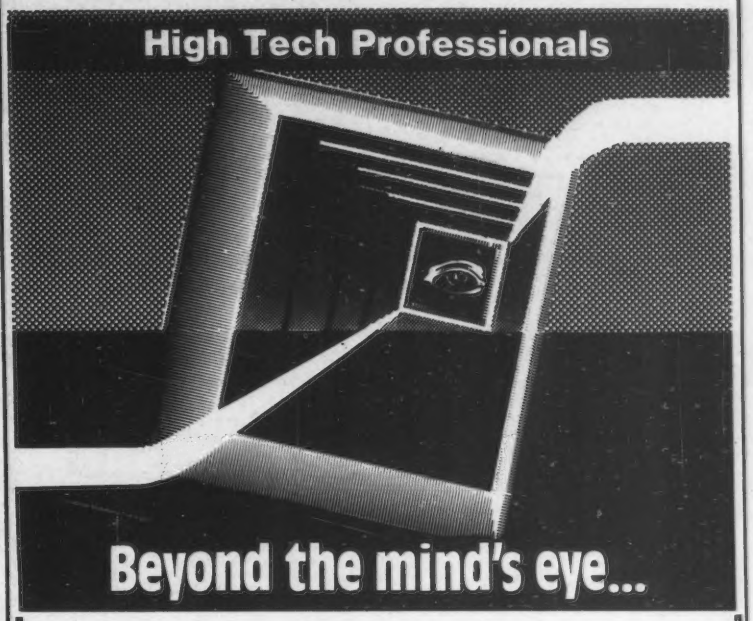

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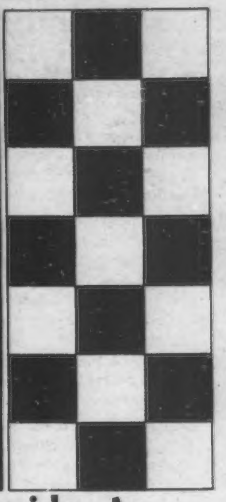

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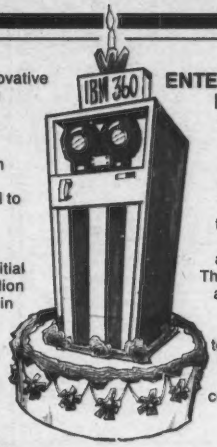

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Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

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Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Selvage, Terminals, Misc. Systems and Miscellaneous.

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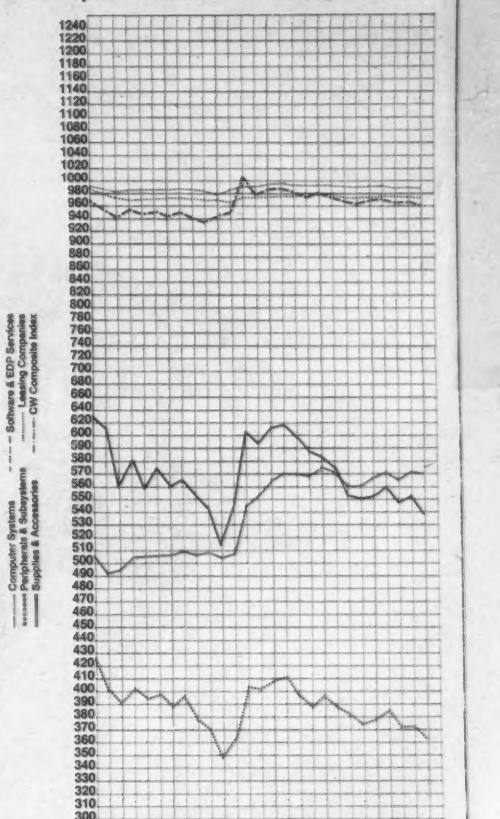

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CLOSING PRICES WEDNESDAY, NOVEMBER 14, 1984

COMPUTER SYSTEMS

			1983-84 RANGE (1)	CLOSE NOV 14 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS		7- 24	7 1/8	- 3/4	-9.5
O	ALTOS COMPUTER SYST		8- 21	9 1/8	- 1/4	-2.6
A	ANIMAL CORP		10- 20	13 7/8	+ 1/8	+1.1
O	APPLE COMPUTER INC		18- 63	23 3/4	-2	-7.7
N	AT&T		15- 21	18 3/4	0	0.0
N	BURROUGHS CORP		44- 77	54 1/2	-1 5/8	-2.8
O	COMPAQ COMPUTER CP		4- 15	5	- 3/8	-6.9
O	COMPUTER AUTOMATION		3- 17	3 7/8	- 1/8	-3.1
A	COMPUTER CONSOLES		9- 26	9 7/8	- 7/8	-8.9
N	CONTROL DATA CORP		25- 62	36 7/8	+1 1/4	+3.2
O	CONVERGENT TECHNOL		5- 41	7	+ 1/4	+3.7
N	CRAY RESEARCH INC		39- 58	52	- 3/4	-1.4
O	DAISY SYSTEMS CORP		14- 28	20	-1 1/2	-5.8
N	DATA GENERAL CORP		27- 59	54 5/8	-1 3/8	-2.4
N	DATAPOINT CORP		14- 31	14 3/4	+ 7/8	+6.3
N	DIGITAL EQUIPMENT		64-125	104 3/4	+1	+0.9
A	EECO INC		12- 16	13 5/8	+ 1/4	+1.9
N	ELECTRONIC ASSOC.		3- 15	3 1/2	+ 1/8	+3.7
N	FLOATING POINT SYST		13- 44	17	-1 1/8	-6.2
N	FOXBORO		28- 47	31	- 1/4	-4.2
O	GENERAL AUTOMATION		6- 16	5 7/8	- 3/8	-6.0
N	GOULD INC		21- 44	22	+ 1/4	+1.1
N	HARRIS CORP		23- 49	26 7/8	+ 7/8	+3.3
N	HEWLETT-PACKARD CO		31- 43	34	-2 1/4	-6.7
N	HONEYWELL INC		44- 69	60	+ 1/8	+0.2
N	IBM		103-134	123 1/8	-2 5/8	-2.1
O	IPL SYSTEMS INC		2- 14	1 3/4	- 1/4	-12.5
N	ITT CORP		21- 47	27	+1 1/8	+4.0
A	MVA-COM INC		13- 35	17 3/4	- 3/8	-2.0
N	MANAGEMENT ASSIST		9- 29	27 1/4	+ 3/8	+1.3
N	MATSUSHITA ELEC(ADR)		60- 88	59 1/2	-7	-10.5
N	MODULAR COMPUTER SYS		6- 16	7	- 1/4	-3.4
N	MOHAWK DATA SCI		9- 17	16	+ 3/8	+2.6
N	MOTOROLA INC		29- 49	34 5/8	0	0.0
N	NAT'L SEMICONDUCTOR		11- 28	12 1/4	0	0.0
N	NBI INC		17- 36	17	+ 1/8	+0.7
N	NCR		21- 34	26 1/4	- 1/8	-0.4
N	PERKIN-ELMER		18- 27	25 1/8	+1 1/8	+4.2
N	PRIME COMPUTER INC		11- 26	16 1/2	- 1/4	-1.4
N	SPERRY CORP		35- 50	37 7/8	- 1/8	-0.3
O	STRATUS COMPUTER INC		9- 17	9 1/4	- 3/4	-7.5
O	TANDEM COMPUTERS INC		15- 40	17 7/8	-1 1/8	-5.9
N	TANDY CORP		24- 62	24 5/8	0	0.0
O	TELEVIDEO SYSTEMS		3- 41	3 1/4	0	0.0
O	TELXON CORP		8- 17	16	- 3/4	-4.4
N	TEXAS INSTRUMENTS		101-169	121 7/8	+2 3/8	+1.9
A	ULTIMATE CORP		15- 24	16 7/8	+ 7/8	+5.4
O	VECTOR GRAPHICS INC		0- 9	1/4	-1/16	-20.1
A	WANG LABS "B"		24- 42	27 1/8	7/8	-3.1
A	WANG LABS "C"		24- 42	27 3/8	+ 1/2	-1.7
N	XEROX CORP		35- 52	37 3/8	+ 3/8	+1.0

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	10- 22	21	0	0.0
A	CMI CORP	4- 10	6 3/8	- 3/8	-5.5
N	COMDISCO INC	10- 42	12	0	0.0
O	CONTINENTAL INFO SYS	5- 16	7 1/2	+ 1/8	+1.6
N	CPT INC	10- 16	16	+ 1/4	+1.5
O	FINALCO GROUP INC	4- 12	6	- 1/4	-4.0
O	PHOENIX AMERICAN INC	5- 17	9	- 1/4	-2.7
O	SELECTRENT INC	11- 21	10 1/2	0	0.0
N	U.S. LEASING	29- 44	37	+1 1/4	+3.4

COMPONENTS

N	ADVANCED MICRO DEV	25- 41	30	-1	-3.2
O	ADV'D SEMICONDUCTOR	7- 38	16 1/2	+ 1/4	+1.5
N	ANALOG DEVICES INC	20- 32	22 5/8	-1 3/8	-5.7
N	ANALOGIC CORP	10- 31	12 1/4	-1 1/8	-8.4
N	APPLIED MAGNETICS CP	9- 17	9 5/8	+ 3/8	+4.0
O	MACCO CORP	6- 12	6 7/8	+ 1/4	+3.7
O	MICRO MASK INC	10- 19	10 3/8	0	0.0
N	TERADYNE	23- 39	24 3/4	-1 1/8	-4.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; I=INTERNATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	2- 8	2	- 1/2	-20.0
N	ADVANCED SYSTEMS INC	14- 22	14 1/4	- 1/4	-1.7
O	ADP COMPUTERS INC	11- 32	11	-1 1/2	-12.0
O	AMERICAN SOFTWARE	13- 31	13 1/4	+ 1/4	+1.9
N	ANACOMP INC	2- 19	2	- 1/4	-11.1
O	ANALYSTS INTL CORP	5- 17	5 1/4	0	0.0
A	APPLIED DATA RES	19- 37	27	+ 1/4	+0.9
O	ASHTON TATE	6- 19	7	+ 1/2	+7.6
O	ASK COMPUTER SYSTEMS	13- 21	16	- 1/2	-3.0
B	ASTRONYME CORP IND	1- 7	1 1/2	- 1/8	+11.1
N	AUTOMATIC DATA PROC	30- 44	37	- 3/4	-1.9
O	COMPUTER ASSOC INT'L	15- 35	17 3/4	0	0.0
O	COMPUTER HORIZONS	8- 20	8 3/4	- 5/8	-9.6
O	COMPUTER NETWORK	3- 11	8 3/4	+ 1/4	+2.9
N	COMPUTER SCIENCES	11- 23	13 7/8	+ 3/8	+2.7
O	COMPUTER TASK GROUP	12- 19	15	- 1/4	-1.6
O	COMPUTER USAGE	5- 18	5 1/8	- 7/8	-14.5
O	COMPUTONE SYSTEMS	4- 23	6 3/8	+ 7/8	+11.6
O	COMSERV CORP	1- 16	3 1/4	+ 1/2	+18.1
O	COMSHARE	7- 14	7 1/8	- 1/4	-3.3
N	CULLINET SOFTWARE	24- 50	40 1/2	-2 1/4	-5.2
O	CYCARE SYSTEMS INC	16- 25	19 1/2	- 1/4	-1.2
O	HOGAN SYSTEM INC	9- 27	9 1/4	- 3/4	-7.5
N	GENERAL ELECTRIC CO	48- 59	57 1/8	- 5/8	-1.0
N	GTE CORP	36- 48	40 1/8	+1 1/4	+3.0
O	INFORMATICS GENERAL	15- 32	16 1/8	- 3/8	-2.2
O	INFORMATION SCIENCE	5- 17	5 1/4	0	0.0
O	INFOTRON SYSTEMS CP	24- 43	24 1/4	- 3/4	-3.0
O	KEANE ASSOCIATES	6- 15	12	0	0.0
A	LOGICON	18- 31	28 1/4	+1	+3.4
O	LOTUS DEVELOPMENT CP	15- 49	22 1/2	+2 1/2	+12.5
O	MCI COMMUNICATIONS	6- 28	8	- 3/4	-8.5
O	MNGT SCI AMER INC	9- 13	10 1/4	- 3/8	-3.5
O	MATHEMATICAL APP GRP	6- 18	8 1/2	0	0.0
O	MICOM SYSTEMS INC	31- 58	34	+ 1/4	+0.7
O	MICROPRO INT'L CP	3- 10	2 3/4	- 1/4	-8.3
O	MONCHER-WEBER CP	6- 22	14 7/8	+ 1/8	+0.8
O	NATIONAL DATA CORP	6- 26	8	- 5/8	-7.2
O	ON-LINE SOFTWARE INT	6- 29	5 1/2	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	11 7/8	0	0.0
N	PLANNING RESEARCH	10- 21	10 1/8	- 1/4	-2.4
O	POLICY MGMT SYSTS CP	22- 35	24 1/4	-1 1/4	-4.9
O	PROGRAMMING & SYS	4- 8	4 1/2	- 1/8	-2.7
N	REYNOLDS & REYNOLD	28- 52	34	+1 1/4	+3.8
O	SEI CORP	11- 34	13 1/4	- 1/2	-3.6
O	SHARED MEDICAL SYST	23- 43	24 7/8	-2 5/8	-9.6
O	SCIENTIFIC COMPUTERS	6- 14	5 1/2	- 3/8	-10.2
O	SOFTWARE AG	9- 15	15	+ 5/8	+4.3
N	URS CORP	10- 19	12 3/4	- 3/8	-4.6
N	UCCEL	7- 17	12 3/4	+ 1/4	+2.0

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	2- 7	2 7/8	0	0.0
A	ANDERSON JACOBSON	4- 25	4 1/4	- 1/2	-10.5
O	AUTO-TROL TECHNOLOGY	8- 29	6 1/4	-1 1/2	-19.3
O	AVANT-GARDE COMPUTNG	15- 29	20	0	0.0
O	BANCTEC INC	5- 22	6 1/4	- 1/4	-7.4
A	BEEHIVE INT'L	1- 15	5/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	20	- 1/8	-0.6
O	CAMDEX CORP	1- 3	2	- 1/4	-11.1
N	CENTRONICS DATA COMP	6- 28	9 5/8	- 7/8	-8.3
A	CETEC CORP	7- 12	7 7/8	- 1/8	-1.5
A	COGNITRONICS	4- 20	4 1/8	- 1/8	-2.9

SUPPLIES & ACCESSORIES

N	AMERICAN BUS PRODS	17- 23	21	+ 1/4	+1.2
N	BARRY WRIGHT	22- 33	27 1/4	-1	-3.5
A	DUPLEX PRODUCTS INC	22- 27	26 1/2	0	0.0
N	ENNIS BUS. FORMS	19- 28	23 3/4	- 1/8	-0.5
N	3M COMPANY	69- 90	82	- 3/4	-0.9
N	MOORE CORP LTD	35- 51	44 7/8	+1 1/8	+2.5
O	STANDARD REGISTER	27- 43	41 1/2	+ 1/4	+0.6
N	WALLACE COMP SERVICE	23- 33	29 3/4	- 1/4	-0.8

OTHER

N	COMPUGRAPHIC CORP	26- 40	28	-1 1/2	-5.0
O	COMPUTER TRANSCEIVER	1- 10	3/4	0	0.0
N	COMPUTERVISION CORP	20- 53	39 5/8	-1 1/4	-3.0
N	CONRAC CORP	11- 24	13 7/8	0	0.0
A	DATAPRODUCTS CORP	15- 32	16 3/4	+ 1/4	+1.5
A	DATARAM CORP	4- 12	4 3/8	- 1/8	-2.7
O	DATA SWITCH CORP	6- 41	6 1/4	- 1/4	-3.8
N	DATUM INC	5- 17	5 1/2	+ 1/4	+4.7
O	DECISION DATA COMPUT	9- 16	10 3/4	+1 1/2	+12.2
O	DOCUFEL-OLIVETTI	5- 35	5 1/8	+ 1/2	+10.8
N	ELECTRONIC M & M	5- 11	5 7/8	- 3/8	-6.0
O	ENDATA, INC	7- 16	7 3/4	+ 1/2	+6.8
O	EVANS & SUTHERLAND	12- 50	12 3/8	- 1/8	-1.0
N	GANDALF TECHNOLOGIES	9- 14	13 1/4	+ 1/8	+0.9
N	GEN'L DATA COMM IND	10- 20	18 1/8	+ 1/4	+1.3
N	HAZELTINE CORP	16- 33	29 3/8	-1 1/2	-4.8
O	ICOT CORP	2- 8	4	+ 5/8	+18.5
O	INFORMATION INTL INC	10- 19	11 1/4	- 1/4	-2.1
O	INTECOM INC	7- 21	9 5/8	0	0.0
O	INTEL CORP	27- 45	29	0	0.0
A	LUNDY ELECTRONICS	7- 19	9 1/8	+ 1/2	+5.7
O	MEGADATA CORP	6- 15	12 7/8	+ 1/8	+0.9
A	MSI DATA CORP	9- 25	9 1/2	- 3/8	-3.7
N	NASHUA CORP	19- 29	25 5/8	- 1/8	-0.4
O	NETWORK SYSTEMS CORP	14- 34	22 3/4	+1 1/4	+5.8
N	NO AMERICAN PHILIPS	30- 40	37	- 1/2	-1.3
N	NORTHERN TELECOM LTD	30- 49	36 7/8	- 7/8	-2.3
O	OMEX	1- 6	1/8	0	0.0
N	PARADYNE CORP	11- 26	14 1/2	- 1/8	-0.8
O	PENRIL CORP	9- 14	11 1/2	0	0.0
N	PLESSEY CO (ADR)	25- 41	28 1/4	+ 1/2	+1.8
O	PRINTRONIX INC	16- 34	19	- 1/4	-1.2
O	RANTEC CORP	6- 23	6	- 1/4	-4.0
N	RECOGNITION EQUIP	10- 17	13 7/8	+ 1/2	+3.7
N	ROLM CORP	30- 69	48 7/8	+ 3/4	+1.6
N	SANDERS ASSOCIATES	36-120	37 3/4	- 3/8	-0.9
O	SOAH DATA	1- 3	1	- 1/8	-33.3
O	SCAN-TRON CORP	9- 19	11 3/4	0	0.0
N	SCIENTIFIC ATLANTA	8- 23	9 1/4	+ 1/4	+2.7
O	SEAGATE TECHNOLOGY	5- 28	4 5/8	- 1/2	-9.7
N	STORAGE TECHNOLOGY	3- 23	5 1/4	- 7/8	-21.2
O	SYKES DATATRONICS	1- 13	1 3/8	- 1/8	-8.3
O	SYSTEMS & COMP TECH	20- 39	25 1/2	- 3/4	-2.9
A	T BAR INC	7- 17	7 1/2	- 1/4	-3.2
A	TAB PRODUCTS CO	13- 20	16 1/2	0	0.0
O	TANDON CORP	7- 25	8 7/8	-1 1/8	-14.6
A	TEC INC	6- 12	9 1/8	- 1/4	-2.6
N	TEKTRONIX INC	52- 87	57 7/8	-2 7/8	-4.7
N	TELEX	19- 35	32	-1 1/4	-3.7
O	TESDATA SYSTEMS CP	2- 17	2 1/4	- 1/4	-10.0
O	TIMEPLEX INC	13- 23	17 3/4	0	0.0
O	VISUAL TECHNOLOGY	3- 26	2 5/8	- 1/8	-4.5

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